News of the Industry Begins Page 279

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LAND AIR WATER

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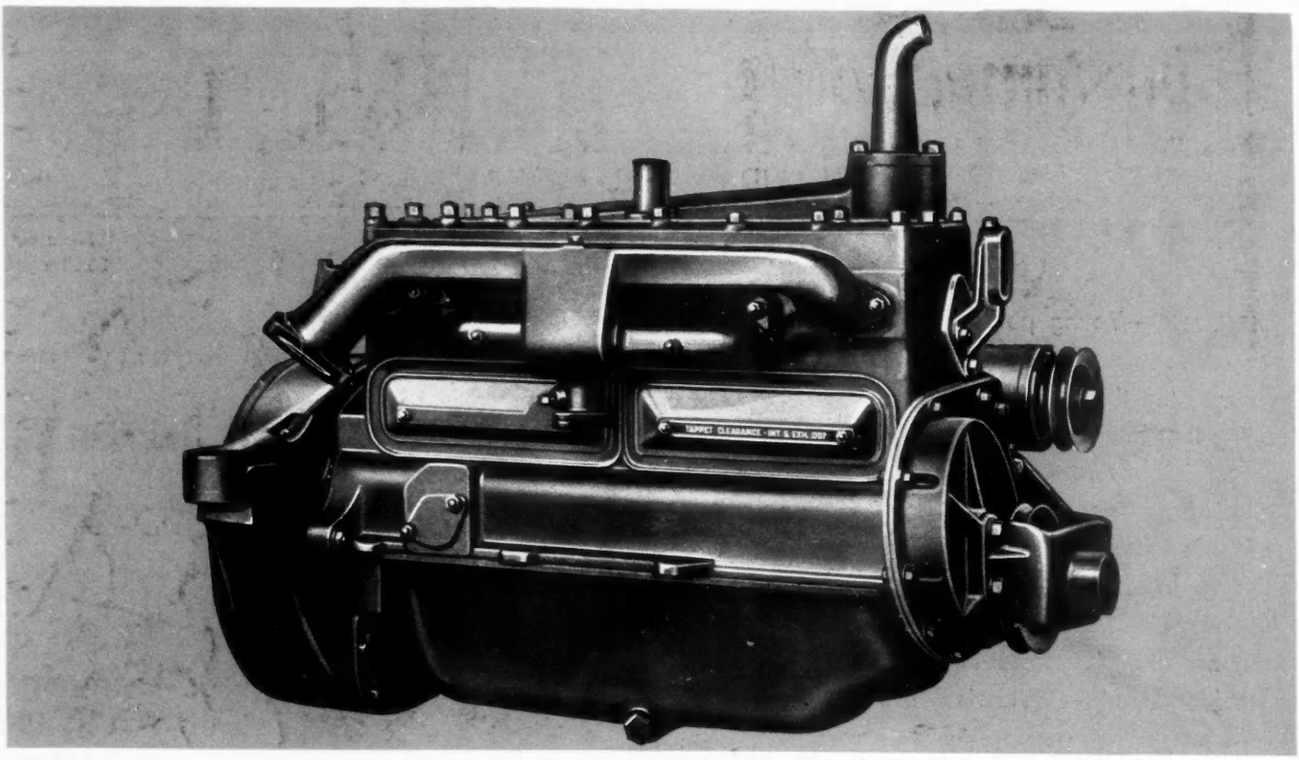

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AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

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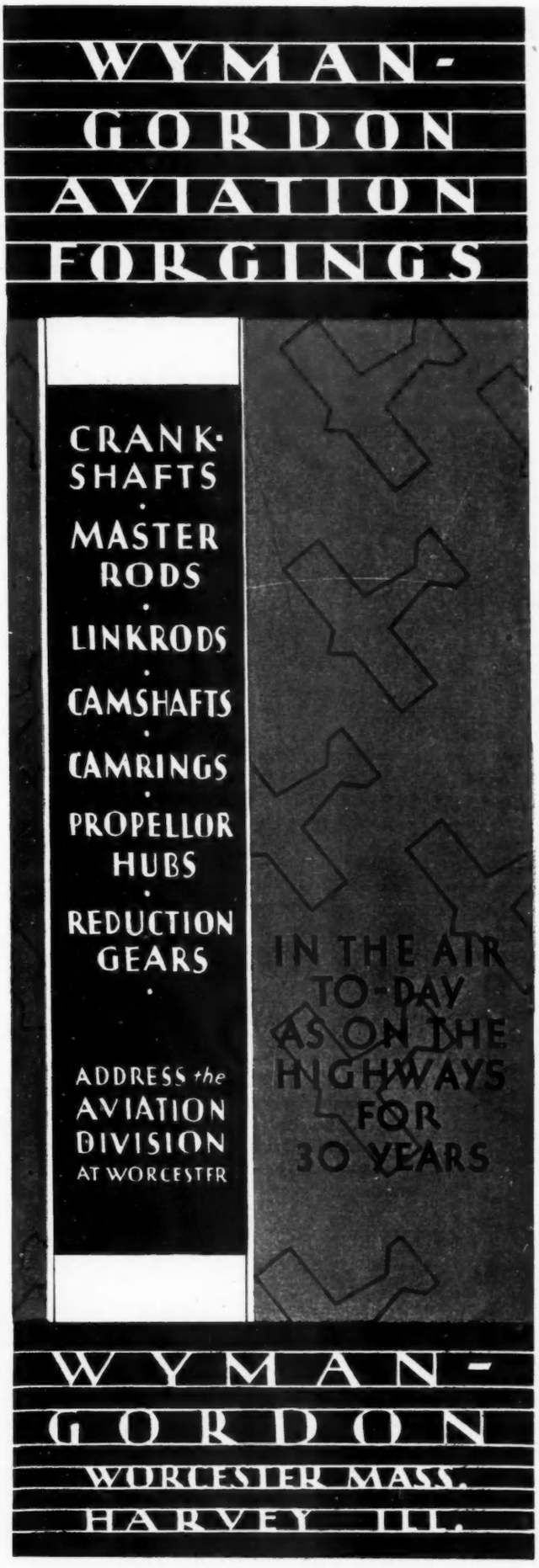
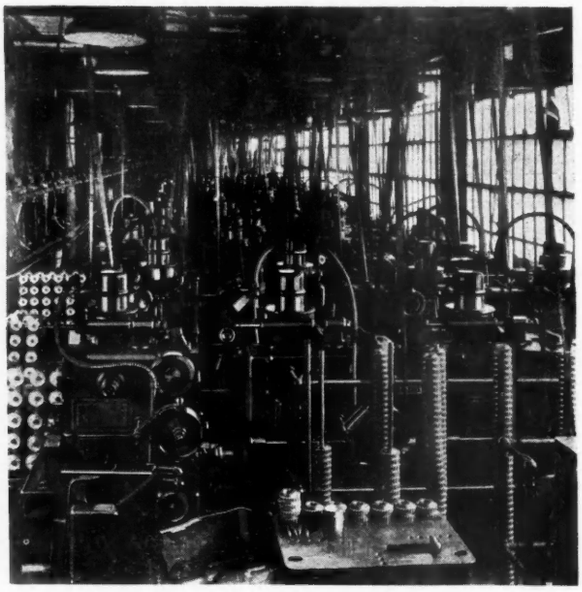


93 in one Battery



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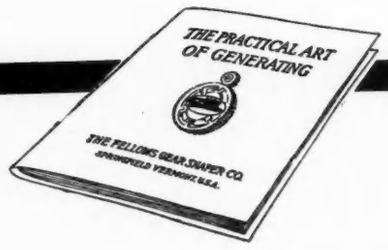
"We are completely sold on Fellows products," said the manager of this prominent automobile plant. He went on further to state that up until the time they installed Fellows Gear Shapers they did not know what service really meant.

Several years ago they decided to build a new line of transmissions and called in the Fellows engineering representatives, telling them what they wanted and asking their advice. All of the drawings for this transmission were turned over to the engineering department at the home plant of the company and recommendations were made including machines for cutting the gears, the types of cutters to use, fixtures, inspection equipment, etc. The manager said that it was in some trepidation that he ordered everything that had been specified, but was now glad he had done so because today they are producing gears at the lowest cost that they have ever done in the history of the company. THE FELLOWS GEAR SHAPER COMPANY, Springfield, Vermont, U. S. A. (Or Detroit Office, 1149 Book Building).

The plant referred to in this advertisement uses nothing but Fellows Gear Shaper products for finishing and inspecting gears. In this way they eliminate the disadvantages of divided responsibility.



FELLOWS *Gear Shapers*

AUTOMOTIVE INDUSTRIES

VOLUME 64 FEBRUARY 21, 1931 NUMBER 8

Ford Cut to Dealers Will Not Affect Other Company Discounts, is Belief

Ford Sales

Discount and Price Changes

Cars*		Trucks
1929		1929
Jan. 81,500	Flat 20% Discount Effective from Introduction of Model A	Jan. 13,019
Feb. 77,000		Feb. 13,313
March 116,900		March 17,897
April 149,900		April 22,890
May 148,600		May 22,364
June 133,600		June 19,528
July 157,200		July 24,503
Aug. 141,800		Aug. 22,405
Sept. 116,500		Sept. 19,470
Oct. 107,200	Oct. 31. Flat 17½% Discount Announced	Oct. 20,978
Nov. 71,900	Nov. 1. Price Reduction of Entire Line	Nov. 15,550
Dec. 53,600		Dec. 11,258
1930		1930
Jan. 72,700		Jan. 13,233
Feb. 92,100		Feb. 14,208
March 127,000		March 19,551
April 151,100		April 21,757
May 148,500	May. 17½-21% Sliding Scale Discount Announced	May 19,758
June 116,600	June 2. Price Reduction of Popular Models	June 15,669
July 113,200		July 19,841
Aug. 80,100		Aug. 17,086
Sept. 67,800		Sept. 17,531
Oct. 57,300		Oct. 18,155
Nov. 34,200	Nov. 28. Price Reduction on Rumble Seat Roadster	Nov. 11,487
Dec. 30,600	Dec. 3. General Price Reduction	Dec. 9,046
1931		1931
Jan. 36,200	Jan. Revised Discount (of May) 17½-21%	Jan. 9,200
Feb.	Jan. 19. Price Reduction of Entire Line	
	Feb. 2. Price Increase of Roadster	
	Feb. 6. Flat 22% Discount Announced	

*Approximate

by
Norman G. Shidle

"FORD finally has reached the point where he must compete for business on the same basis as any other automobile manufacturer." So runs much of the comment from important executives of car and truck companies on the recent increase of Ford dealer discounts to a flat 22 per cent.

Price, which was his chief merchandising weapon for years, the reasoning of many of these executives continues, began to lose its potency several years ago, finally resulting in the scrapping of the Model T and the development of the Model A. Following the announcement of this modernized automobile by Ford came increases in the number of body styles, wide color options, an extensive advertising program and numerous other manifestations of the fact that Ford was gradually calling into play all of the various marketing weapons which other manufacturers had found necessary and powerful in the past.

Continuing to combine these new merchandising efforts with low price, Ford catapulted himself back into something like the dominant sales position which he had held in the days of the Model T's most resplendent glory. But to hold that position—as to achieve it — increased development of merchandising, as distinguished from purely physical distribution policies, seems to have proved necessary.

This, at least, is the rather general interpretation which these rival executives are putting on Ford's increase of discounts. Details of what this latest move will mean in greater Ford dealer profits have been interestingly worked out by Donald Blanchard, editor of *Automobile Trade Journal*, and appear in an article entitled "Discount Boost Cheers Ford Dealers," which appears in the March issue of that publication.

New Discount is Ford's Highest

The new discount is the highest ever given Ford dealers, at least since the advent of the Model T, and is a full 7 per cent above the low point of 15 per cent which applied on the Model T several years ago.

It is interesting, too, to note that this new high in Ford discounts follows closely on the heels of the mid-January, 1931, Ford price cut.

While it is the general opinion among other manufacturers that Ford's increase was necessary to bring him into line with competition, the fact remains that in increasing discounts immediately following a price cut Ford has reversed the usual practice of the industry. Lower discounts almost invariably have been announced simultaneously with price revisions throughout the automobile industry, retailers usually feeling very fortunate if they merely held to previous discount figures when the list prices were decreased.

Nevertheless, it is unlikely that dealer discounts throughout the trade will be affected by the Ford move, although the possibility of readjustments in some directly competing lines seems within the realm of logical conjecture. Direct contact with practically every major producer since the Ford discount increase became known shows an almost unanimous belief that the reasons behind the Ford move are peculiar to Ford and consequently not applicable to discount policies of other manufacturers.

With no announcement of the discount change nor any comment on it available from the Ford Motor Co., it is inevitable that much speculation regarding the basis of the move should go on throughout the industry. Among the causes for the Ford move suggested by important vehicle factory men are to be found the following:

"A gesture to bolster the morale of his dealer organization."

"To meet trading competition."

"He was forced to. . . ."

"To stabilize his dealer organization."

"To put his dealer organization in better financial shape."

"Ford dealers simply have not had enough discount."

"To give his dealers a fair break under present marketing conditions."

"To meet objections of his dealers that their discounts were not adequate to profitable operation."

Will a lot of dealers be found saying to their factories, "Even Ford had to raise his discount; certainly we ought to get more?"

It's too early to answer that question with any finality. Most factory sales executives feel at present that no great impetus to the general dealer desire for more discount will be given by Ford's move. Even with 22 per cent, a number point out, Ford is still below nearly every other maker in discount. One important sales manager who contacted several score of dealers in the week following the Ford announcement, says that only in one case was the Ford move mentioned, and then only casually. "Consequently," he concludes, "the reaction from our dealers is as if they had never heard of it, and if they have, they don't care."

Other Dealers Still Have Discount Advantage

A rather typical opinion from another chief sales executive is: "As far as the rest of the industry is concerned, all the dealers handling other lines, almost without exception, get a higher discount, and, in many cases, a substantially higher discount than the 22 per cent on which Ford dealers are now operating. . . . Consequently, I cannot see that this indicates any general move in the industry."

Whether this attitude on the part of the dealer body in general will remain fixed as time goes on, no one can predict with certainty. It is clear at the moment, in any case, that every indication points toward the development of very little disturbance to discounts in other lines.

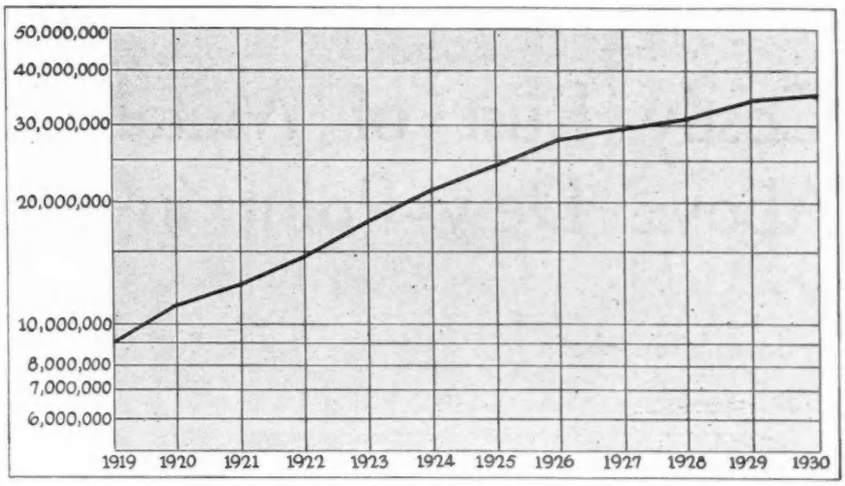
Reports from Ford dealers reflect a universal delight with the higher discounts and more vigorous sales effort already is said to be resulting in a great many Ford dealer establishments as a result of the encouragement received.

How Model A Discount Changes Have Affected Ford Dealer's Gross Profits

(Figured on the basis of an average list price of $525)

Number of Cars and Trucks Sold in One Year	Flat 20% Discount Effective from Introduction of Model A to Nov., 1929	Flat 17½% Discount Effective from Nov., 1929, to May, 1930	Sliding Scale 1-50 cars..17½% 51-100 cars..18% 101-150 cars..19% 151-500 cars..20% 501-up cars..21% Effective May, 1930, to Jan., 1931	Sliding Scale 1-25 cars..17½% 26-75 cars..18% 76-125 cars..19% 126-400 cars..20% 401-up cars..21% Effective Jan., 1931, to Feb. 6, 1931	Flat 22% Discount Effective Feb. 6, 1931
25	$2,625.00	$2,296.87	$2,296.87	$2,296.87	$2,887.50
50	5,250.00	4,593.75	4,593.75	4,659.37	5,775.00
75	7,875.00	6,890.62	6,956.25	7,021.87	8,662.50
100	10,500.00	9,187.50	9,318.75	9,515.62	11,550.00
125	13,125.00	11,484.37	11,812.50	12,009.37	14,437.50
142 average dealer*	**14,910.00**	**13,046.25**	**13,508.25**	**13,794.37**	**16,401.00**
150	15,750.00	13,781.25	14,306.25	14,634.37	17,325.00
400	42,000.00	36,750.00	40,556.25	40,884.37	46,200.00
500	52,500.00	45,937.50	51,056.25	51,909.37	57,750.00
600	63,000.00	55,125.00	62,081.25	62,934.37	69,300.00
1,000	105,000.00	91,875.00	106,181.25	107,034.37	115,500.00

*Registrations of Model A cars and trucks averaged about 142 per Ford dealer in 1930.



World registrations of motor vehicles increased from about 8,800,000 in 1919 to 35,810,768 during 1930. This world census has been compiled annually by The American Automobile (Overseas Edition) and El Automovile Americano since 1922. Complete tabulations will appear in these publications and in the Annual Statistical Issue of AUTOMOTIVE INDUSTRIES, Feb. 28.

World Motorization Increased 2.1 Per Cent During 1930

by George E. Quisenberry
Editor, The American Automobile (Overseas Edition) and El Automovile Americano

DESPITE world economic depressions and the numerous business recessions during the past year, world motorization increased 2.1 per cent during 1930. On Jan. 1, 1931, a total of 35,810,768 motor vehicles were in operation in Africa, America, Asia, Europe and Oceania. This figure, which was considerably larger than had been expected, was compiled from hundreds of reports from all parts of the world and brings the operation and registration totals up to the beginning of the year.

The United States constributed only slightly to the increase of registrations. France, reflecting a brief period of prosperity during a part of 1930, led the world in percentage of gain with an increase of about 178,000 motor vehicles.

The world, excluding the United States, passed the nine-million mark for the first time, the returns showing a total of 9,119,819 motor vehicles registered and in use. This increase was a gain of 7.2 per cent, and although smaller than the 1929 increase over 1928, showed the largest replacement sales gain in history.

Business and financial conditions brought actual reduction in the use of total number of vehicles last year to only a few territories. Increased operations in the remainder of the world far more than overcame losses.

Although materially reduced from the phenomenally high record of 1929, exports of automotive products during 1930 from the United States and Canada reached the unexpected valuation of $431,112,953.

Exports of the larger-sized trucks were the highest ever reached. Shipments of many replacement items, service equipment, tires, etc., were either larger or equal to the exports of 1928.

Shipments and assemblies from abroad reached 449,029 cars and trucks last year, slightly above the 10-year average. Exports were approximately one-eighth of the total production of U. S. and Canadian plants.

The average value of trucks exported in 1930 was $663, an increase, in the face of depression, of $95 over the 1929 average of $568. This same tendency was noted in passenger car shipments, although in this classification the trend toward higher-priced units was not so pronounced. This fact is particularly interesting in view of the series of decreases of factory list prices during 1930.

The 1930 export demand was a striking demonstration of the solidity of the automotive trade in Africa, the Americas, Asia, Europe and Oceania. The motor car, motor truck, bus and other types of motor vehicles are vitally needed in the transport requirements of the world. Their use has been curtailed, not halted, in spite of the general economic depressions of the past year.

The upswing of more normal business has, therefore, a strong foundation on which the automotive trade may confidently chart its future course.

Costly Rust of Metal Supply Can be Above Dew-Point in Storage Room

by Joseph Geschelin

Factors Influencing Corrosion

"THE larger proportion of iron and steel subjected to atmospheric conditions is in the form of plain and corrugated sheets, wire, plates and structural materials, and amounts to at least 80 per cent of the total tonnage of steel produced.

"If the Electrochemical Theory is the correct explanation for corrosion in water, it naturally follows that it is also true for corrosion in the air. The only difference is in the relative importance of the various controlling factors. In atmospheric corrosion, moisture is the main controlling variable. The action of hydrogen sulphide, sulphur dioxide and other such substances is very much more rapid in moist than in dry air. Both Evans and Vernon, however, have shown that some corrosion occurs when only an absorbed liquid film exists on the surface, and that such a film may form when the moisture in the air is below the saturation point. That is, corrosion can proceed as a result of this film under conditions where no visible moisture is present on the metal surface."—*From "Corrosion—Causes and Prevention," Speller.*

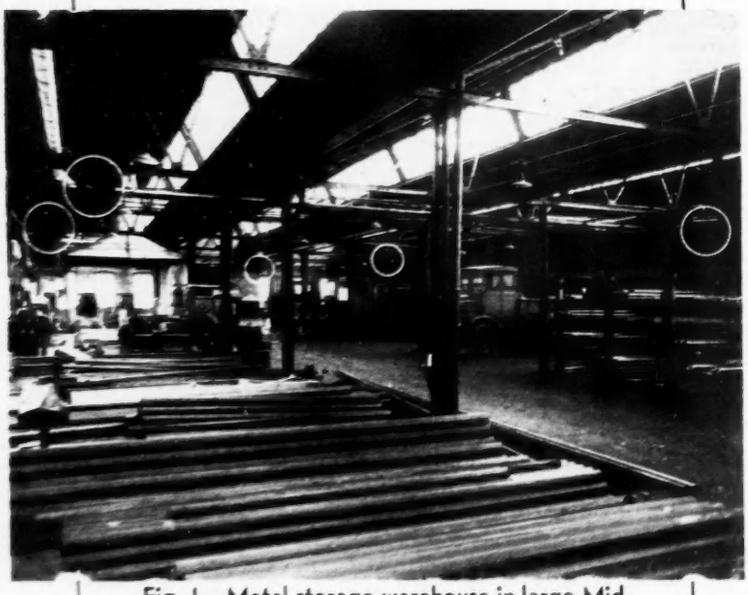


Fig. 1—Metal storage warehouse in large Mid-Western truck plant. Note installation of unit heaters overhead, particularly their relation to the storage rack + + + + + +

BECAUSE of the heavy toll exacted by the rusting of iron and steel stocks, more metal-working plants may profitably avail themselves of a relatively simple means of minimizing and perhaps eliminating the effect which is primarily due to atmospheric surface corrosion. Although relative humidity is usually taken as an index of surface corrosion, the real danger indicator is found to be the dew-point temperature. For as the temperature of the surroundings approaches the dew-point, precipitation of water vapor occurs. Naturally, this applies not only to the surface corrosion of metal but also concerns the drying of paint and enamel as well as the rusting of parts in the process of machining.

Contrary to popular impression, relative humidity is greater during winter months and the dew-point is critical during these months, although we usually associate high relative humidity with the physical discomfort which usually is felt during hot humid summer days. The logical conclusion inferred from a scientific study of the problem is that atmospheric corrosion of iron and steel stock, such as large sheets, strip, and bar stock, may be eliminated simply by maintaining the surface temperature somewhat above the prevailing dew-point temperature. And the easiest way of doing this is to isolate such stock, inclose it within a suitable partition and provide some means of maintaining a regulated temperature.

Before going into the actual study, let us refresh our minds concerning some of the physical factors involved. We commonly speak of moist and dry air, but usually our ideas are likely to be loosely worded. Generally speaking, the atmosphere around us contains a varying amount of water vapor and the amount of vapor that can occupy a given space is governed entirely by the temperature. To simplify matters, the following fundamental definitions are restated: (1) *Absolute humidity* is the weight of a cubic foot of water vapor. It is constant for 100 per cent saturation for a given temperature but otherwise it represents the exact amount of water

Prevented if Temperature is Kept

To approach the problem intelligently, an analysis of local humidity and vagaries of the dew-point temperature must be made + + + + +

vapor present at the time measurements are taken. This factor is also given in terms of vapor pressure.

(2) *Relative humidity.* Since air may contain varying quantities of water vapor up to 100 per cent saturation at the same temperature, it is desirable to express the degree of saturation. Thus the term relative humidity expresses the relation between the amount of water vapor present and the amount of water vapor that would be necessary for 100 per cent saturation at that same temperature. For convenience, this may be expressed by the following formulas:

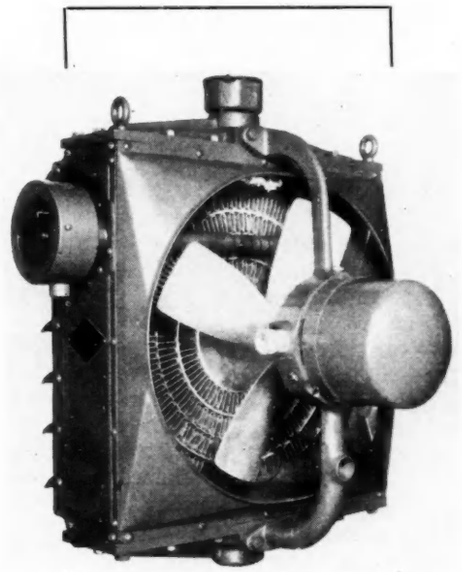
$$\text{Relative humidity} = \frac{\text{Absolute humidity}}{\text{Humidity at saturation}}$$

$$= \frac{\text{Mass of vapor per cu. ft.}}{\text{Saturated vapor per cu. ft.}}$$

$$= \frac{\text{Vapor pressure}}{\text{Saturated vapor pressure}}$$

(All referred to the same temperature)

(3) *Dew-point* is the temperature at which saturation occurs and condensation of the invisible water vapor begins.



Courtesy ILG Electric Ventilating Co.

Fig. 2—Electric - type unit heater + + +

Generally speaking, all iron and steel stores are exposed to surface corrosion in varying degrees and actual precipitation of water on the surface occurs whenever the temperature of the metal is at the dew-point temperature or falls below it. This follows directly from the definition of the dew-point since that is the point at which the condensation of invisible water vapor takes place. Although relative humidity is a good index of atmospheric conditions, dew-point temperature is the important element since it is necessary to know the relation between the prevailing temperature and the dew-point temperature if condensation is to be avoided.

By the same token, whenever some metal stock is brought in from the warehouse or stockroom into a relatively warmer production department, precipitation of water may occur if the temperature of the metal is below the dew-point there. This is particularly serious when the relative humidity is high. Another serious situation occurs during winter months where the iron and steel stocks is stored in relatively unprotected places. Generally, there is more danger of metal collecting moisture when the temperature is rising than when it is falling, particularly during cold weather, for the reason that the dew-point and temperature of the metal do not, usually, change as rapidly as the air temperature. When large masses of metal are thoroughly cooled and the temperature starts on an upward trend, if the dew-point rises more rapidly than the temperature of the metal it may soon pass it and moisture will begin to collect on the surfaces of the metal as soon as that condition is present. Of course, even in a warm space a large pile of sheet metal or bar stock may be below room temperature due to the uneven distribution of heat and also because of the tendency of the colder air to stratify around this mass of metal. Thus it seems that even under comparatively favorable conditions, a large store of iron and steel may be subjected to rusting, despite ordinary precautions.

To approach the problem intelligently, a critical analysis must be made of local humidity conditions and the vagaries of dew-point temperature. For this particular study, United States Weather Bureau reports were obtained for typical automotive centers such as Detroit, Cleveland, Chicago and Philadelphia. According to Table 1, which is based on data contained in the Atlas of American Agriculture, we find that the average relative humidity runs about the same throughout the geographic regions in which we are particularly interested. Moreover it is noticeable that high relative humidity occurs during winter months while lower relative humidity prevails during the warmer season. We must bear in mind, of course, that relative humidity is a ratio only. It does not neces-

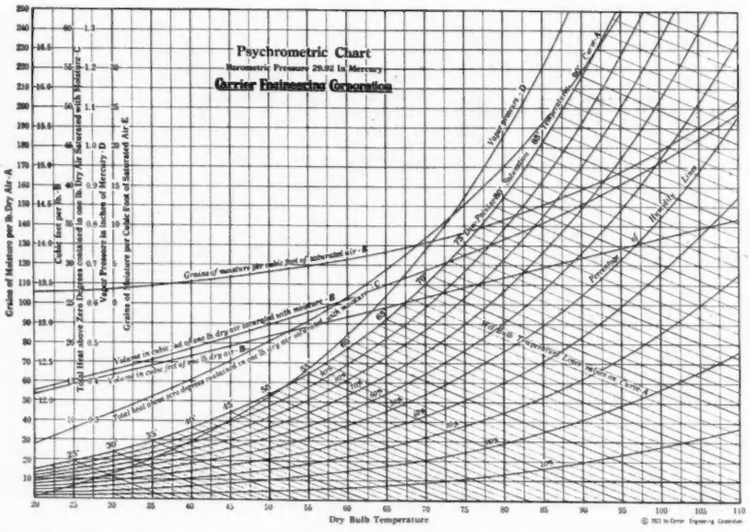


Fig. 3—Carrier psychrometric chart

Dry Bulb Temperatures are represented by vertical lines with values indicated on lower edge of chart.

Wet Bulb Temperatures are represented by oblique lines with values indicated at their intersections with the curved line marked "Dew-Point or Saturation Temperatures."

Dew-Point Temperatures are represented by horizontal lines with values indicated at their intersections with the curved line marked "Dew-Point or Saturation Temperatures.

Percentages of Relative Humidity are represented by converging curved lines with values indicated thereon.

Any two of the above properties may be found if the other two are known. The following examples indicate the methods of using the chart. It should be noted that in the case of saturated air, the Dry Bulb, Wet Bulb and Dew-Point Temperatures are identical.

sarily mean that there is more water vapor by weight in the atmosphere during winter months than there is during the hot humid months, but it does mean that during the colder months, the air is inclined to be more saturated and the danger of precipitation is more pronounced. Table 1 is based on a twenty-five-year average and the figures given are 8 a. m. readings Eastern Standard Time. Incidentally, the United States Weather Bureau found that relative humidity is near its maximum at 8 a. m. and near the minimum at 8 p. m. as averaged over a long period of time.

Although space does not permit a detailed analysis for all the automotive centers, we have plotted in Figs. 4 and 5 the day-by-day march of relative humidity, outside temperature, and dew-point temperature at 7 a. m. in Chicago for 1930 taken from data supplied by the weather bureau station at that point.

The curves show strikingly the close approach of outside temperature to the dew-point boundary during winter months and show just as strikingly how the dew-point boundary definitely drops away during warmer weather. Of course, this is giving a rather broad picture. Actually there may be times during the winter when the dew-point is far below outside temperature and there are many times during the warm months when the dew-point closely approaches or nearly equals the outside temperature.

It is important to note that the character of the dew-point temperature curve varies with geographic location. Although the curves given for Chicago may fairly represent conditions prevailing at the lakes, the picture may be entirely different for inland cities such as Philadelphia, Indianapolis and Columbus, for at these points the dew-point temperature has smaller variations. It does not follow the extreme variations in outside temperature as closely and hence the danger of approaching dew-point conditions is even more serious. As a matter of fact, in these inland centers, there will be many periods during the winter months when the outside temperature is very close to the dew-point and the same will be true of some periods during warm weather.

In the light of the foregoing, what steps may be taken to minimize if not altogether eliminate atmospheric corrosion? Obviously, the first step is to isolate the stores of metal and locate them where the temperature may be controlled. And the next step will be the installation of some simple means of providing heat and controlling the room temperature. In the case of a warehouse or a small metal-working plant, it will be desirable to heat the entire building and keep the metal stock inside this building. An example of this is shown in Fig. 1.

A word of caution about the heating arrangement. It is not sufficient to simply provide a heating system. The important thing is to get a positive circulation of air in the storage space and particularly around the piles of metal. Heat and cold, like other physical phenomena about us, tend to follow the line of least resistance and unless the air is positively circulated, the piles of metal will tend to remain colder than room temperature and will be surrounded by a stratified layer of cold air. Quite to our surprise, therefore, even when precautions have been taken, the iron and steel bars or sheets still may show some rusting.

So far as we can see, all heating requirements may be met by a suitable installation of unit heaters since they supply a large volume of air with a large positive pressure. Moreover, the stream of heated air can be directed wherever desired. Practical evidence of this is found in the following quotation illustrating the experience of the Florence Stove Co. "Answering your inquiry of Jan. 6, our stockroom for metal stock is of glass and tile construction with cement floor and wood roof. We at first heated this with steam but had some trouble with sweating. At last we installed a unit heater and directed the hot stream toward the floor at one section of the room and it seemed to eliminate our troubles from collection of moisture and it is our opinion that the unit heaters are very helpful in this respect."

Now a word about cost. Actually the amount of

Table I

25 Year Averages Relative Humidity 8 a. m. Eastern Standard Time

	January	April	July	October
Michigan	80-90	70-80	70-80	80-90
Wisconsin	80-90	70-80	70-80	80-90
Ohio	80-90	70-80	70-80	80-90
Indiana	80-90	70-80	70-80	70-80
New York	80-90	70-80	70-80	80-90
	*60-70	*50-60		
Pennsylvania	80-90	70-80	70-80	80-90
	*60-70	*50-60		
Illinois	80-90	70-80	70-80	70-80

*Average for extreme Eastern corner.

heat required is not necessarily large since the requisites for safety are met when the temperature of the material within the storage space is above dew-point temperature—remembering, of course, that the critical temperature is to be maintained at the surface of the metal stock. On humid summer days, it may not be necessary to add heat despite the fact that the metal may be near the dew-point temperature at the time. For the influence of air circulation is so important that in the summer, and even during a part of the cooler season, precipitation may be avoided by the simple expedient of setting up a circulation of air by means of the unit heater fan.

In this discussion, we had confined ourselves exclusively to the mechanical requirements for eliminating surface corrosion. Physiological aspects which enter where workers are concerned are not being considered here at all. For simplicity, therefore, it is assumed that in many cases it will be practical to store the metal stock in separate spaces or rooms away from production departments. It is very important to make this point clear because there are other problems in automotive plants which can be solved only by the installation of suitable air conditioning apparatus providing a positive control of humidity, as well as of temperature.

General operations of painting, enameling, etc., might be included in this latter category. Here again, our initial analysis shows that at certain times the effect of relative humidity will be serious enough to prevent proper drying. Where air conditioning apparatus is now used, this is taken care of automatically.

Another somewhat obscure effect of humidity is the infrequent occurrence of corrosion of steel parts in process. Usually this is attributed to the rusting tendency of some cutting fluids, particularly where soluble oil with a high percentage of water is used. Is it not reasonable to assume that this may be due to the precipitation of water vapor where the temperature of the piece itself has dropped below the dew-point temperature of the surroundings, particularly when the machine is standing still?

Now assuming that the iron and steel stores have been suitably insulated and inclosed and provided with a unit heater installation, how will the temperature be regulated and upon what basis will the daily temperature be established? First of all, a large scale chart should be made for the particular locality giving the same data as appears on Figs. 4 and 5. When based on figures averaged over a

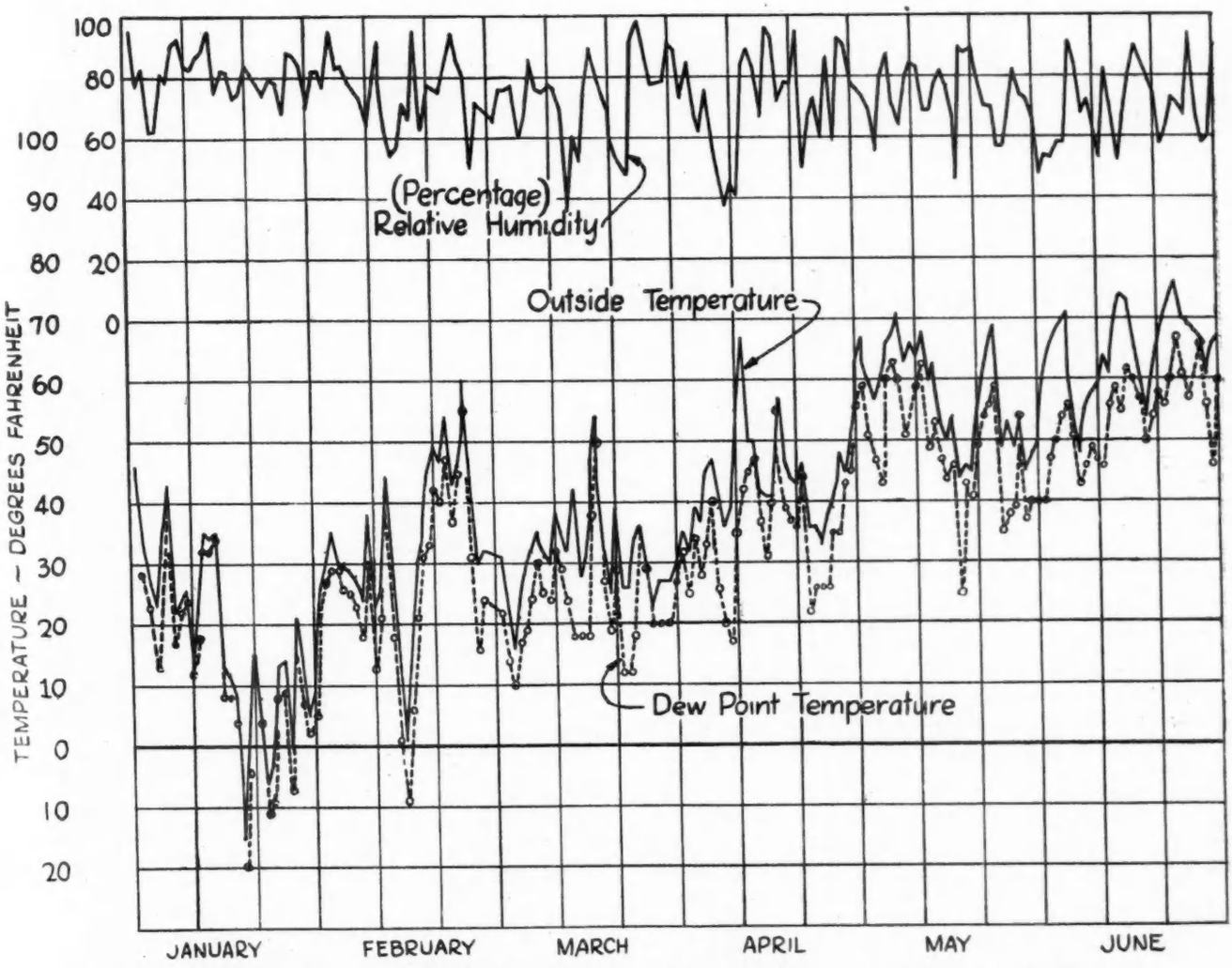


Fig. 4—January to June daily march of relative humidity, outside temperature and dew-point temperature in Chicago during 1930. Figures based on 7 a. m. readings + + + + + + +

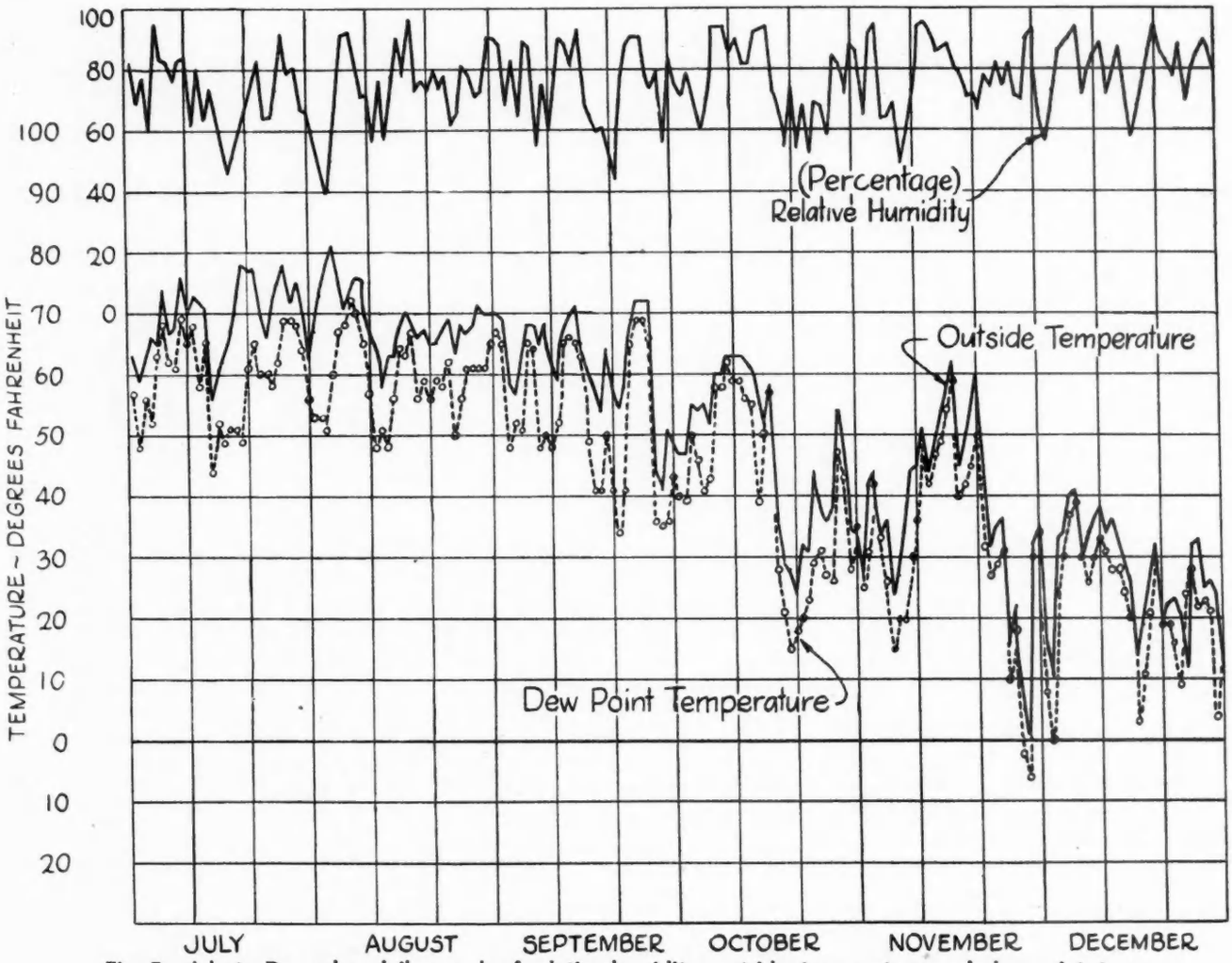


Fig. 5—July to December daily march of relative humidity, outside temperature and dew-point temperature for Chicago in 1930 based on 7 a. m. figures + + + + + + + + +

number of years, these curves will show the usual danger zones and seasons during which dew-point temperature must be carefully watched. Naturally, a constant check will be found desirable since local conditions may vary considerably at times from any given long-time trend. For this purpose daily weather report figures are available at the local United States Weather Bureau; and stations in Cleveland, Chicago, Detroit and Philadelphia in particular are well equipped to provide complete humidity studies daily.

Of course, the desirable thing to do is to install apparatus within the plant for checking atmospheric conditions. For ordinary purposes, a recording wet-and-dry bulb thermometer may be used. However, care must be taken to assure reliability and the instrument should be calibrated frequently. The wet-and-dry bulb thermometer record gives the reading of "depression" (or difference between the two thermometer readings), and the dew-point as well as relative humidity corresponding to this depression can be obtained directly from psychrometric tables or from the psychrometric chart Fig. 3.

To summarize briefly, the foregoing has developed a definite relationship between the dew-point temperature and atmospheric corrosion of iron and steel stock in metal-working plants. Wherever raw stocks of steel strips and sheet and structural shapes are maintained, it will be found desirable to store them in suitable inclosures provided with the necessary heating arrangement, preferably a unit heater installation. The size and location of the unit heater should be carefully worked out to assure a definite control of temperature at the surface of the pile of metal and further to assure a free circulation of air around it. Usually the unit heater is fed from some central source of steam supply but where this is not available, and particularly during the summer months, it may be desirable to use an electric type heater such as shown in Fig. 2.

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Flexibility in Commercial Vehicle Laws Is Imminent Need of Industry

S. A. E. Meeting at Philadelphia inaugurates movement against restriction of chassis dimensions

SPEAKING at the February meeting of the Philadelphia section of the S.A.E. on the 11th inst., L. R. Buckendale, of the Timken-Detroit Axle Co., discussed the limitations which present state laws impose upon the design of motor trucks and buses, and particularly upon the design of axles for these vehicles, and pointed out the need for a flexibility in the regulations. Since their introduction on passenger cars some six years ago, balloon tires have found favor also for trucks and buses. These low-pressure tires, of course, are considerably wider for the same carrying capacity than the high-pressure tires formerly used. Moreover, to carry the heavy loads on the axles of large trucks and buses, it is necessary to use dual tires at the rear, and dual low-pressure tires with the necessary spacing occupy a very considerable fraction of the total width permitted for motor vehicles under state laws.

State laws, as a rule, limit the maximum width, length, total weight and weight per wheel, and the regulations are the same in hardly two of the 48 states. A majority of the states have an overall width limit of 96 in., a few have a limit of 90 in., and one has a limit of 84 in. There is also a tendency to limit the gross weight of the vehicle to about 24,000 lb.

Introduction of low-pressure tires had the effect that a vehicle designed for the average maximum permissible load approached very close to the 96-in. width limit, so that the larger and more efficient vehicles with the most up-to-date equipment cannot be used in states with a narrower width limit. Mr. Buckendale discussed the problem of axle design under the present limitations as follows:

"Let us consider the design of a vehicle to use low-pressure tires and come within the common 96-in. width restriction and the maximum gross weight of 24,000 lb. If we assume that we will use dual tires on the rear wheels and single tires on the front wheels, each tire must carry 4000 lb. This will give us 8000 lb. on the front end and 16,000 lb. on the rear tires. This is the ideal condition, but in practice we find that the size of the engine required will compel shifting the front axle and rear axle positions, so that less weight comes on the front and more on the rear. This fact has caused some legislation to fix the minimum on the front at 20 per cent of the gross. Let us assume we get 25 per cent on the front and 75 per cent on the rear. We find that the size of tire required to carry 0.75 x 24,000/4, or 4500 lb. would be 10.50 x 20, with a nominal capacity of 4700 lb. The tire engineer says that when used as duals these tires must be set at a minimum center distance of 12¾ in. The actual width of the tire is approximately 11 in. So, if we position the outer tires at 95½ in. to allow ½-in. spread under load, we have the track of the outer tires 95½ − 11 = 84½ in. The track of the inner tires is 84½ − 25½ = 59 in. The distance between the inner tires is 59 − 11, or 48 in.

"Within this distance of 48 in. we must find room for the driving mechanism, the vehicle springs, the brakes (which legislation requires to be on the wheels) and also clearance for the various parts. Neglecting the brakes for the moment and placing the springs so as to clear the tires, we find that, with a 3½-in. spring, we have a spring center of 40½ in. If we use a 1-in. clip to hold the springs to the axle and allow ⅝ in. clearance of the frame, we have only 34 in. maximum permissible width of frame.

Brake Arrangement is a Problem

"Brake engineers tell us that to stop a 24,000-lb. load operating at passenger-car speeds will require approximately a 17¼-in. effective brake diameter and a width of 5 or 5½ in. The diameter is determined by the practical limit of the pressures that can be applied to the braking surfaces using self-energization or auxiliary power such as air. These pressures are also limited by the maximum pressure that can be applied to the friction surfaces with expectation of reasonable life.

"If we now make up a composite diagram of the conditions we have set up we shall see that many problems are unsolved. We find that when we attempt to place the brake on the wheel it must be nested completely inside the inner tire. With the tire that is available we have a diameter of 20 in. inside the beads. If we subtract the 17¼-in. brake diameter, a radial clearance of only 1⅜ in. remains between the tire and the friction surface of the brake. In this space must be found room for the brake drum, the tire rim, means for holding the rim to the wheel, and the tire valve, and still leave room

for the flow of air required to carry off the heat generated by the brakes.

"This brings us face to face with a real problem. If we consider the brake drum required, we find that the old pressed type drum cannot be used, because a flange is needed to give it stiffness, and there is no room for a flange. The characteristics required in the drum are maximum resistance to distortion from the high pressure set up by the shoes, maximum ability to absorb and dissipate heat, and maximum resistance to abrasion. Of the many materials used, the cast alloy-iron apparently is emerging as the most successful. Castings permit an unlimited variety of shapes. The most desirable form has a series of annular ribs on the exterior surface. These ribs increase the heat-dissipating ability and the stiffness of the brake drum for a given mass of iron. It is also desirable to run radial ribs up the back face of the drum, continuing them at right angles to the annular ribs on the periphery. These radial ribs make possible a lighter drum and at the same time give increased turbulence to the air, thereby helping to dissipate the heat. However, if we attempt to put such a drum into a 20-in. base tire, we find that it will not go; we must compromise on the height of the ribs so that they will merely clear the rims, and also must cut grooves or notches to clear the tire valves.

Tires Absorb Heat from Brakes

"The result of the proximity of the drums to the tires has been to pass heat from the brakes to the tires. This heat, added to the heat set up by the action of the tires themselves, has caused bead temperatures that are too high for reasonable tire life. The result is that the tire engineer wants to reduce the brake diameter to get the drum away from the tire. If this could be done without increasing the width of the brake face, the result would be higher drum temperature, because the same amount of heat would have to be dissipated from a smaller surface, and the resulting high drum temperature would radiate more heat to the tire and cancel the benefit from the increased air space. Furthermore, we started with the smallest practical brake diameter, and we cannot increase the width because the overall width limitation of the vehicle prevents.

"There seems to be only one answer to this problem and that is to increase the inside diameter of the tire used on vehicles above a certain weight. It is suggested that we consider a 22-in. base for tires of 4000 lb. or greater carrying capacity. The drum could be made reasonably heavy and ribbed both annularly and radially, and an ample air gap would be provided for heat dissipation.

No clearance has been provided for chains. We have fixed the spring width at 3½ in.; wider springs would permit lower spring-piles and easier riding and reduce the maximum impact on the road. The desirable 5-in. spring would increase the overall width to 98½ in. The 40½-in. spring center is hardly sufficient to provide lateral stability, especially when the increasing maximum speeds are considered. The 34-in. frame with adequate flanges introduces the problem of trying to find room for the engine required to move the vehicle at the speeds made possible by the low-pressure tires.

"Some relief has been offered by the six-wheel vehicle. Distributing the load on two rear axles has lessened the impact on the roads. This fact has been recognized by the legislatures of some states, which permit greater gross loads on six-wheel vehicles, in some cases 50 per cent more. The result of raising the permissible weight is that the large six-wheeler has come to require the same dual tires as the four-wheeler, and the limitations fixed by the overall width of 96 in. are even more severe.

"The front axle has had its share of problems introduced by the low-pressure tires, which, because of the much greater carcass dimensions, require more space in the extreme position so as to clear the frame and steering gear drag link. That means the track of the front wheels must be greatly increased, and if we do this we promptly run into our old enemy, the 96-in. overall limit. Because of the necessity of holding within limits the distance from the center of tire contact to the axis of the steering knuckle pivot, it is necessary to incline the pivot outwardly at the bottom and nest the whole structure inside the tire.

"The much greater area of contact which the low-pressure tire makes with the ground has made the steering very sensitive to errors in steering geometry. It has become important to have true rolling action; that is, the tires must turn about an axis which, projected, passes through the center about which the vehicle is turning. If this requirement is not met, undue tread wear occurs; and to meet it is not easy, because the balls of the tie rod would have to be positioned inside the tires. A special tie-rod connector was designed, which permits the ball to come closer to the tire, but even with this the correct steering geometry would not be obtained, so the only possibility was to move the steering knuckle pivot further from the tire. This in turn cuts down the turning angle and, of course, increases the overhang on the spindle, thereby increasing the stress and load on the steering knuckle structure. This effect tends to cancel the benefit of the low-pressure tire, insofar as its low impact factor would save the axle structure. However, the advantages of the low-pressure tire outweigh the problems it has created. There is going to be a change in the front end appearance of the heavy vehicles because of the necessary increase in fender width to cover the larger size of tires and the wider tracks."

Regret Legal Limitations

In the discussion general regret was expressed at the obstructions placed in the way of commercial vehicle designers by legal limitations on dimensions and at the fact that the limitations vary from state to state. One speaker said we drive trucks from Maine to Florida, and on the way pass through states where we are subject to different limitations on load capacity, width, length, etc. "Could not something be done to get the laws unified?" Mr. Buckendale in this connection pointed out that the motor truck started out as a vehicle for local transportation but had now become a vehicle for long-distance hauling as well. Many of the early restrictive provisions were adopted through the influence of legislators representing agricultural constituencies which could see no benefit from large trucks and other commercial vehicles. The outcome of the discussion was the decision to appoint a committee to take up the matter with the parent society, as reported in our last issue.

Just Among Ourselves

Speed Limit Becomes A British Outcast

GREAT BRITAIN has abolished the speed limit for automobiles and motorcycles. At the same time it has preserved almost intact the definitions of its old law defining reckless driving and has increased the penalties for violation of that law.

"If any person drives a motor vehicle on a road recklessly, or at a speed or in a manner which is dangerous to the public, having regard to all the circumstances of the case, including the nature, condition and use of the road, and the amount of traffic which is actually at the time, or might reasonably be expected to be, on the road shall be liable, etc." That is the way the British reckless driving law reads in part.

The whole idea embodied in the abolition of the speed limit and the definition of reckless driving is in line with good sense and progressive modern thought. The same trend in legislation has gained some foothold in the United States, but has not progressed nearly so rapidly as might be desired, particularly in regard to local and municipal regulations.

As the British *Motor* points out in commenting on the new English law, "all motorists must realize that it imposes on them additional responsibilities and the need for exercise of greater caution." For the very reason that various meanings can be read into the definition of reckless driving, more drivers may be given to pause before committing reckless acts. And certainly safety as well as driving comfort is increased by the removal of speed limit laws ranging from 10 to 20 m.p.h., which are obviously silly in this year of our Lord, 1931.

And Insurance Is a "Must"

THE overwhelming importance in England of taxes as a part of automobile operating expense as compared to the United States was once more emphasized in our mind by the presence of another article in a recent issue of the British *Motor* which discussed "Popular Standardized Cars which have an Annual Tax of £8 and Less." The cars discussed were, of course, all definitely small vehicles. And among the "Musts" of the new British Road Traffic Act listed in this same publication appear: "Your car must be insured. You must have an insurance certificate. You must produce it on applying for a new car license."

Too Many Body Changes

RECENTLY returned from several years in Europe, E. V. Rippingille of General Motors Corp., made some vigorous comments when comparing European and American body designs in a talk made before the body division of the Detroit section of the S.A.E. early in December.

After pointing out that "In comparison with the methods used in this country, European bodies are not well built," he voiced the following interesting opinion:

"I think American manufacturers have lost something by continual changing of the shape of their cars. All you have to do, apparently, to get a new model nowadays is to press a new molding into a car or change the shape of the tin and that is a new model.

"Now that statement may be a pretty broad one, but I think that if you will look right down into the core of things you will find that you have covered up a great deal of excellence in the structural features of the body. From year to year you have changed the exterior shape, you have made big improvements in the interior and you have changed the exterior of the body just for a passing fancy and for no real reason, and I will bet that you will be going back to some of the body styles that you threw away because, after all is said and done, you can't go on forever. You are going to exhaust these models after a while."

Maybe Handsome is as Handsome Does

WITHIN a month following this comment of Mr. Rippingille's, no less an art expert than H. Ledyard Towle, of Campbell-Ewald, gave it as his opinion at the annual S.A.E. meeting that:

"A peculiar thing about beauty is that when you make a thing that functions properly you have something that is beautiful—without trying to achieve beauty primarily." He went on to indicate—although he did not say so in so many words—that a design which is beautiful when incorporated in a car for a functional reason, loses much of its effectiveness when duplicated on another car which does not demand that design for any similar utilitarian reason.—N.G.S.

Removable Cylinder Liners Permit Comparatively Inexpensive Repairs

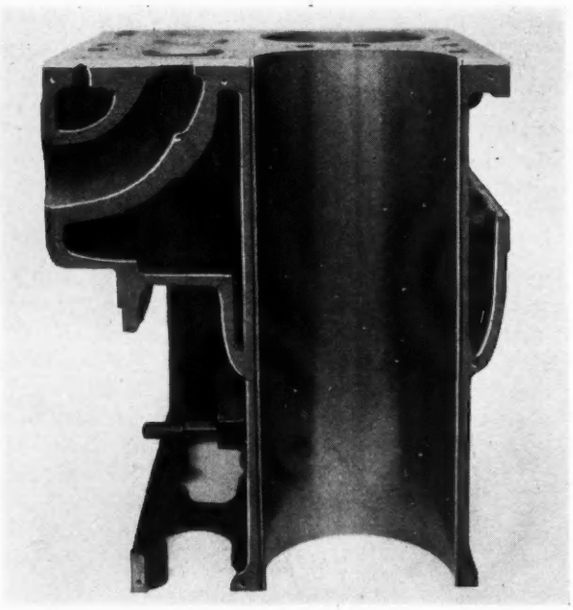
Where the necessary equipment is available the replacement of a damaged liner and piston can be effected in a remarkably short time

IN the great majority of water-cooled engines the cylinders are cast with double walls, and the pistons bear directly on a bored and ground surface of the cylinder block. When internal combustion engines were first used for farm tractors, it was found that in certain districts the dust stirred up by the tractor in operation during dry spells got into the engine and had such pronounced abrasive effects that the cylinder bores and pistons sometimes wore out in a few days. This led to the use of air cleaners on the carburetors of internal combustion engines. However, the air cleaners first used, which were of the centrifugal type, were not very efficient, especially in certain districts of the western United States where the soil consists largely of lava ash, which produces so fine a dust that it cannot be separated out by methods depending upon its inertia. In these districts trouble from rapid wear of cylinder bores continued, and this soon led to the introduction of removable liners, which made it unnecessary to scrap the whole block when the cylinder bores were worn.

Since then removable cylinder liners have come into use also in other types of engines. For instance, some 10 years ago two American automobile companies manufactured cars with engines having their cylinder blocks cast of aluminum. The ordinary aluminum alloy is too soft to make a durable bearing surface, especially when subjected to the high temperature that obtains in the combustion chamber, and so these cylinder blocks were provided with liners of cast iron.

Diesel engines in many cases also are provided with removable cylinder liners. One of the considerations in this case undoubtedly is that the cylinder wall in a Diesel engine under certain unusual conditions, such as too early injection of the fuel, is subjected to enormous stresses. If the cylinder walls are an integral part of the cylinder block, one can never be absolutely sure of the thickness of metal in the walls, owing to shifting of cores and other uncertainties in the manufacturing process. Where a removable liner is used it is machined both inside and outside, and the wall thickness therefore is definite within the limits of machining tolerances. Moreover, when such a liner is cast there is much less danger of porous or weak spots being formed than when a complicated casting like a cylinder block is being made.

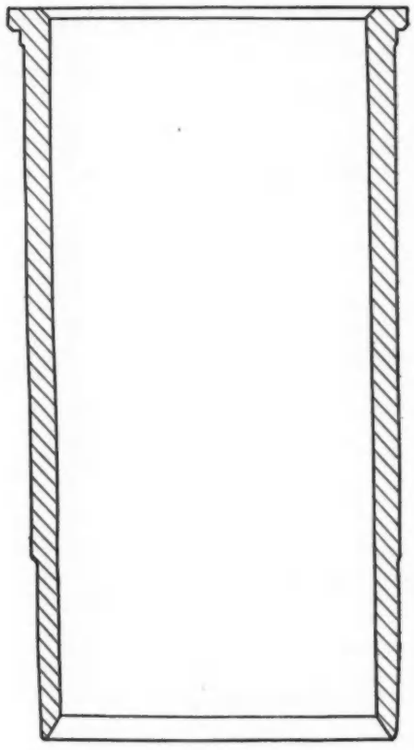
A number of manufacturers who entered the automotive field as manufacturers of farm tractors, later added motor trucks to their line and extended the use of removable sleeves to their truck engines. The use of such sleeves, of course, offers particular advantages in the case of engines with a large number of cylinders all cast in one block, because the more complicated and expensive the block the more serious the financial loss when one cylinder is accidentally injured. Thus we find that many of the high-powered marine engines that have been marketed recently, such as the Lycoming model UF 12-cylinder and the Alfco (American-La-France and Foamite Corp.) twelve and sixteen-cylinder, have removable sleeves. In these engines the two-cylinder blocks and the crankcase



Dry liner as used to recondition engines in England + + + + + + + + +

Rapid and

by P. M. Heldt



Wet liner as used in International Harvester truck and tractor engines

are made in a single casting by the manufacturers.

There are two types of cylinder liners, the so-called dry and wet liners. Where the first type is used the cylinder block is cast with double walls as usual, and the inner cylinder is bored out and has a thin liner inserted. In this case, of course, the liner does not come in contact with the cooling fluid. The cylinder wall is therefore double and will usually be heavier than where no liner is used. At the present time dry liners are not used very extensively in this country, but they have come into use for repair purposes in England in recent years. That is, if the cylinder bore is worn out so that a refitting is required, the cylinder is rebored sufficiently larger than its original bore to permit of the insertion of a thin sleeve. These sleeves are cast by the centrifugal process, which assures a hard, dense structure that is claimed to possess superior wearing qualities.

Where wet liners are used the cylinder block forms only the water jacket wall and the lower-end extension of same, and the inserted liner forms the cylinder wall, which is in direct contact with the cooling water on its outer side. This involves the provision of a water-tight joint at both the upper and the lower end. At the upper end the liner is usually provided with a turned flange on the outside, which fits snugly into a counter-bore of the block, and the cylinder head gasket extending across the top surfaces of the block and the liner, assures a water-tight joint. At the bottom it is usual to turn grooves in the bore of the block into which suitable packing rings are inserted. Various materials have been used for the packing at the lower end, but at present it is common to use vulcanized rubber rings. The grooves for the packing rings are turned with slightly inclined sides, and the rubber rings are molded to an inside diameter slightly smaller than the outside diameter of the sleeve or liner, so that when the latter, which is beveled off on the outside at its lower end, is forced into the block, the packing ring is expanded and forced into intimate contact with the inclined walls of its groove.

The chief advantage of the removable cylinder liner, as already pointed out, is that it permits of a rapid and comparatively inexpensive repair, especially in case a single cylinder bore is injured. The International Harvester Co., for instance, which uses removable liners in its tractor and truck engines, supplies complete packaged sets consisting of a standard liner with piston and rings, ready to be substituted for the damaged units. Where the necessary equipment is available the replacement of a damaged liner and piston can be effected in a remarkably short time.

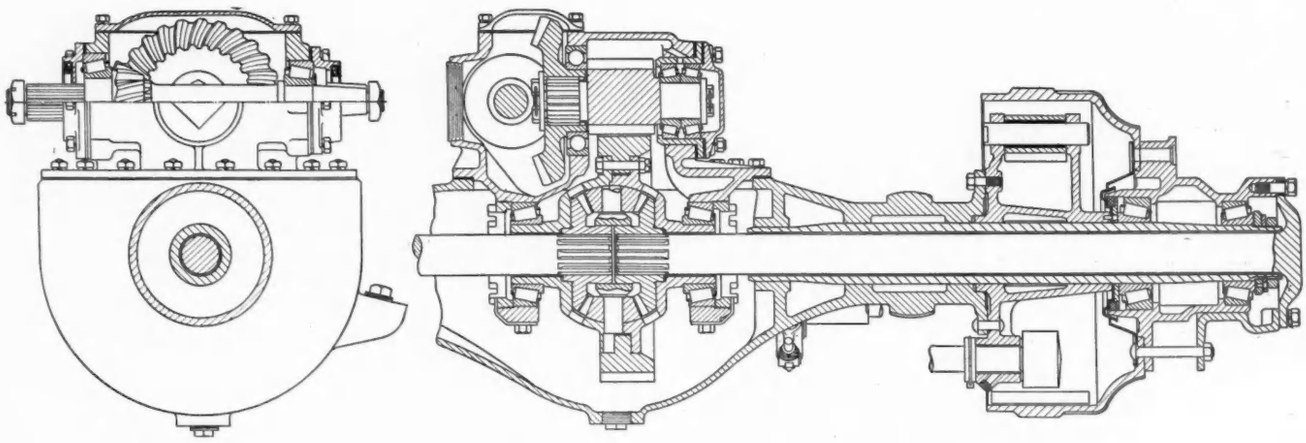
Where this method of dealing with worn-out or damaged cylinder bores is used, oversized pistons are no longer required, and the stocks that must be carried by service stations, dealers and jobbers can thus be reduced. Where wet liners are used the cylinder block is much easier to cast, the core work, particularly, being much simpler. The separate liner, moreover, has the advantage that it can be made of a special grade of material having better wearing qualities than ordinary gray iron, without excessive extra cost for material. For instance, a nickel-chromium cast iron can be used for the liners, or else pearlitic cast iron or iron centrifugally cast. If extreme resistance to wear is desired, even steel liners, nitrided, can be used, as is done in the Hispano-Suiza engine.

There is, of course, also a certain advantage in having cylinder walls that are of uniform thickness throughout, as the heat expansion of such a cylinder will be more nearly uniform and it stands to reason that it will hold compression better and also will tend to reduce oil pumping.

The use of removable liners is probably attended with some extra cost to the manufacturer in all cases, although where wet liners are used, the extra cost cannot amount to very much. There is, of course, some extra machine work, as the liners must be machined both inside and outside. On the other hand, there will undoubtedly be a saving from a smaller number of rejections of cylinder blocks.

One of the few European passenger cars carrying engines with removable liners is the Lanchester. In a letter received from George H. Lanchester, technical director of the Lanchester Motor Co., it is pointed out that in all high-speed engines there is compara-

(Turn to page 268, please)



Section through the front axle of the SD series unit, showing the arrangement for through drive

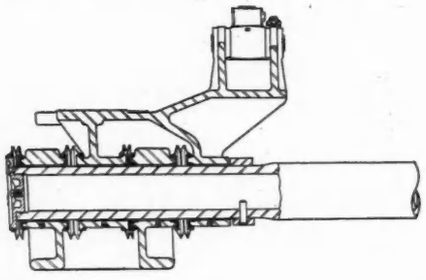
Timken Axle Line Expanded by Four Tandem Units Carrying Dual Balloons

New series of front axles provide wider tracks and greater wheel turning angles with larger tires

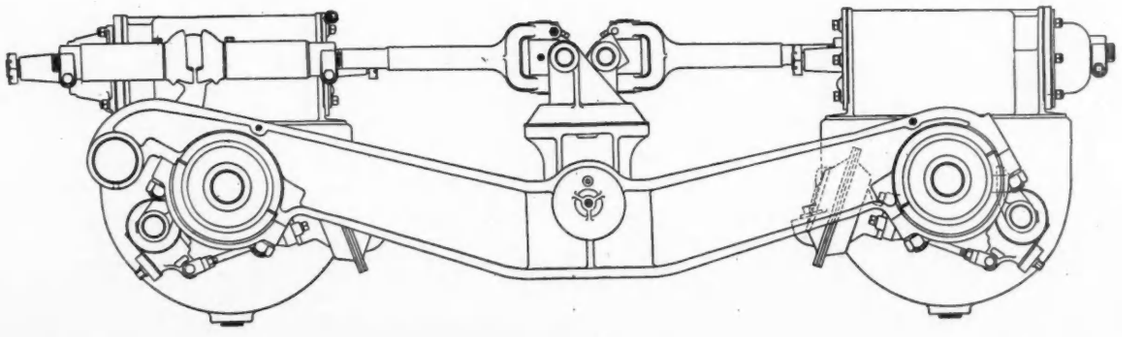
THE Timken-Detroit Axle Co. has expanded its line of tandem axles to include four new units, all carrying dual balloons. Known as the SW 300 and 410, and the SD 310 and 410, the units are comparable in load capacity to the SW 300 and 400 series, designed to carry high-pressure tires, while the large low-pressure balloons provide additional tire capacity.

In the new series, the SW 310 and 410 are of the worm-drive type, while the two SD units represent a still further development, tandem axles with double reduction drives.

Naturally a number of modifications had to be made in the original SW series in order to accommodate the low-pressure tires and still remain within the 96-in. overall width limit imposed by many states.



Side view of worm-drive axle unit and detail showing mounting of central cross tube



These modifications include a decreased wheel track, increased wheelbase of the units, narrower spacing between spring pads, and greater clearance between the bearings of the load equalizer beam and spring pad brackets on the central cross tube.

In the design of the new units every effort was made to maintain interchangeability as far as possible, in order to reduce both production and maintenance costs. Thus, the hubs, axle shafts, etc., of the SW 310 series are interchangeable with corresponding parts of the Timken 65720 worm-drive axle, while the units of the 410 series are interchangeable with those of the Timken 66720 axles for two-wheel drive trucks.

The track was decreased to keep the overall width within the legal limit of 96 in. when carrying the larger 10.50-in. section low-pressure tires. The larger tires have a load rating approximately 20 per cent higher than the largest tires it was possible to use on the former SW series axles, which should be reflected in decidedly higher tire mileage.

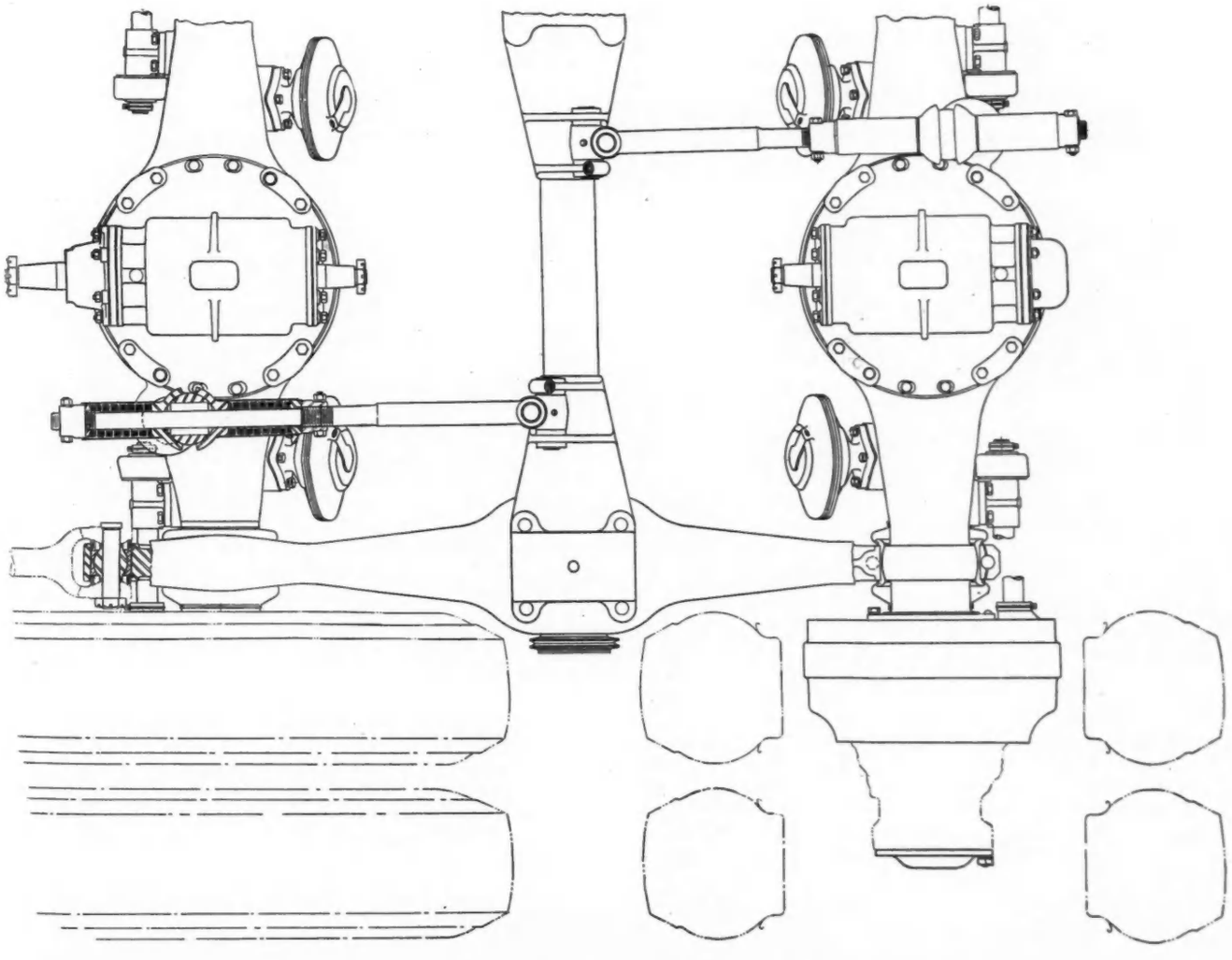
The larger wheelbase found on the new tandem axles (52 in. as compared with 46 in. formerly) is for the purpose of providing more clearance with the larger tires. Of course, some sacrifice had to be made to permit the use of these tires, this taking the form of a reduction in the maximum permissible frame width, the 42-in. nominal spacing of the spring seats (with 5-in. springs), limiting the frame width to 34 in.

Some increases in angularity during deflection of one or more wheels are produced in the new units. These are provided for in the new design by increased side clearances between the bearings of the spring seat brackets and load equalizer beam on the central cross-tube. Leather boots are provided at these points to prevent the entry of dirt into the bearings through the larger clearance spaces.

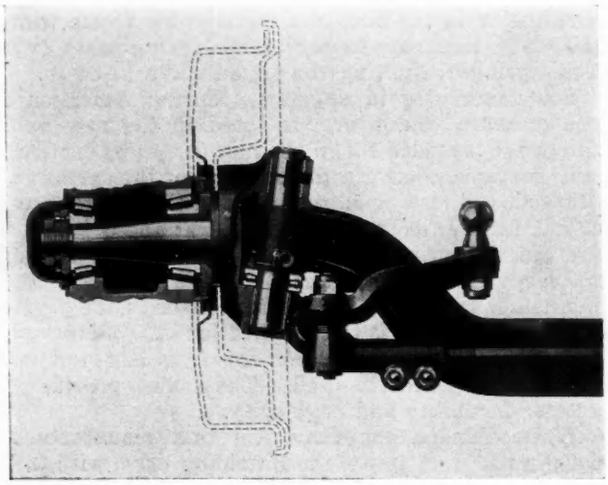
Another change which has been made in the general design of the units is the substitution of two-cross-pin-end type of torque rods for the four ball-stud type torque rods formerly used. These also provide for greater flexibility and angularity.

While Timken engineers feel that manufacturers usually will want to use the Hotchkiss drive with these units, connections for radius rods are being provided on the load-equalizer beam, the same as formerly. The joints, however, are now of the ball-and-socket type.

The new tandem units are designed primarily for the use of Westinghouse air brakes. However, on the smaller SW 310 units provision can be made for hydraulic brakes.



Plan view of worm-drive axle unit



One of the new series of Timken front axles

The Timken policy of making heavy-duty axles available with both the worm and the double-reduction type of final drive has now been extended to the tandem units. In these units the axle housings and shafts for the front and rear units are not interchangeable, for in order to provide for a through drive in the forward unit in such a way that the angularity of the intermediate propeller shaft would be restricted as much as possible, the gear housing of the forward axle had to be offset to one side. The illustration shows the simple manner in which the "through" drive has been achieved, primarily by reversing the position of the bevel gear on its shaft, and providing this shaft with a three-bearing mounting, a large radial load ball bearing near the bevel gear, and two opposed Timkens for radial load and thrust on the far side of the shaft.

Moreover, the housing has been worked out in such a manner that it has a standard mounting flange. The location of the gear housing in the front unit is such that the pinion shaft is off center to the extent of 1½ in. It is stated that with a length of 25⅞ in. between the pinion shafts of front and rear axles of the units, the resulting angularity is not sufficient to cause trouble. In the former units the operating angularities normally ran much higher than this.

Aside from the differences in the housing of the front axle, its axle shafts, etc., and of course the gear carrier cases and their component parts, the SD series tandem six-wheel units are identical with their worm-drive prototypes, wheelbase, track, load-equalizer beams, hubs, etc., being interchangeable.

Eight New Front Axles

A new series of eight front axles for motor trucks providing wider tracks for greater front wheel turning angles with larger tires is now available from the Timken-Detroit Axle Co. A number of these axles are also available in a "modified" wide track, having somewhat shorter spacing between spring pads. These cover the four smaller sizes, and provide for differences in frame width, with the same effective shorter turning radius.

The capacities of these axles have been increased by the use of heavier axle centers. Steering knuckles are also heavier, and are of the reverse Elliott type with inclined knuckle pins of large diameter. Steering tie rods have connectors of the ball-and-socket type and are adjustable for length and provided with automatic take-up for wear.

Wheel camber is 1 deg. A universal mounting has been provided to allow for the installation, optionally, of Lockheed hydraulic, Bendix Duo-Servo, or Westinghouse air brakes. Cast alloy or stamped steel brake drums are optional where 16-in. brakes are specified, while cast alloy drums are standard for all 17¼-in. brakes. Timken taper roller bearings are provided in the wheel hubs, as well as on the knuckle pins to take the thrust.

The effective lengths of the steering arms are somewhat greater than formerly. This provides both for the higher maximum wheel angularity (up to 40 deg.), and for the longer steering arms found on many trucks due to the mounting of the steering gear on top of the frame for powerplant clearance.

Following are installation dimensions of the new series of front axles:

Series Front Axle	Track	Range of Spring Center Drilling	Drop From Spindle To Pad	Effective Length of Steering Arm
30,000	61 or 63	24½-27½ or 27½-30½	3½	8½
31,000	61 or 64	24½-27½ or 27½-30½	3½	8½
33,000	66½ or 69½	25-30 or 28-33	3½	8⅝
35,000	68 or 71	25-30 or 28-33	3½	8⅝
26,050	71	32-36	½	8¾
26,450	71	29-35	4	9⅛
27,050	71⅜	32-36	½	8¾
27,450	71⅜	29-35	4	9⅛

Removable Cylinder Liners

(Continued from page 265)

tively rapid cylinder bore wear, resulting in piston slap. This, he thinks, may be less pronounced in American cars because they usually carry comparatively large engines, and slower speeds are customary here than in Europe.

Mr. Lanchester points out that there are three principal sources or wear in automobile engines, viz., (1) particles of ferrous material from the cylinder surfaces; (2) particles of hard carbon resulting from combustion, and (3) particles of road dust taken in through the carburetor. The latter can be almost completely eliminated by the use of a suitable form of air filter. Carbon can be to a large extent prevented from passing into the oil by keeping down the clearance between piston and cylinder wall, and, therefore, if cylinder wall wear is eliminated, items 1 and 2 are automatically removed.

The way removable liners are fitted in England, they undoubtedly add to the cost of production. Hard-chromium liners, machined ready for insertion into the cylinder block, of from 3 to 3¼-in. bore, cost about $3.00 each. This is an extra expense, since the cylinder has to be bored to receive the liners, and the latter must be ground after being shrunk in place. The advantage is in the increased life of the engine, the periods between overhauls being materially lengthened.

In England a business of rejuvenating engines by reboring their cylinders and providing them with thin liners of centrifugally cast iron has been worked up, and according to a firm prominent in the overhauling business in that country, the cost is about the same as that of regrinding the bores and fitting oversize pistons. The process is said to be favored by a certain proportion of commercial vehicle owners, while private owners generally prefer the usual regrinding job.

Shrinkage of 7% in British Automobile Production is First Drop Since 1923

Importation of commercial vehicle chassis dropped to 1291 last year from 16,205 of the year before

AUTOMOBILE production in Great Britain in 1930 (up to Sept. 30) did not reach the volume that it did during the previous year, but the recession was not nearly as great as that suffered by the American industry in 1930. The British automobile industry produced 182,256 cars during the twelve months which ended Sept. 30, 1929, and 169,669 during the year which ended Sept. 30, last, hence the shrinkage in production was less than 7 per cent.

These figures are taken from the annual review of activities in the British motor industry published by *Engineering* of London, in its issue of Jan. 16. This review is based upon official figures published by the government and by the Society of Motor Car Manufacturers and Traders. Figures issued by the Ministry of Labor show that in 1930 the number of insured persons in the motor car industry was 247,140, but of these 40,647 were unemployed, leaving 206,493 actually employed in the industry. There was a slight increase in the number of insured persons in the industry (nearly 2000) in the course of the year, but the number of unemployed increased from 17,000 (roughly) to 40,000, and the number actually employed decreased by about 9 per cent.

This is the first year since 1923 that there has been a decrease in British motorcar production. It will be noted that the decrease in production was slightly less than the decrease in employment, and *Engineering* observes that this reflects efforts at "rationalization," which have been long overdue in some instances.

Since 1928 the British Board of Trade distinguishes between chassis built solely for commercial uses and other chassis, and this makes it possible to get a better picture of British motor exports. The decrease in the exports of complete passenger vehicles was quite nominal, and the number of such cars exported during the year exceeded that of every year previous to 1929. On the other hand, there was a further sharp recession in the number of chassis exported, from 9901 in 1929 to 3982 last year. In 1927 the number of chassis exported from Great Britain was above 13,000, many of these going to Australia, where the body-building industry was being fostered. The market in Australia has been greatly depressed since that year, owing to local economic conditions. The total number of complete cars and chassis exported decreased from 33,798 in 1929 to 23,208 in 1930. Malayan and New Zealand imports accounted for a good portion of the decline of about 4600 in the number of complete cars exported. Considering the general state of depression in the trade of the world, it is considered that the British motor car industry maintained its position well.

Private cars registered in Great Britain increased in number from 998,489 in 1929 to 1,060,672 in 1930.

(*Turn to page 273, please*)

International Exports of Passenger Cars. (Units)

Exports From	1923	1924	1925	1926	1927	1928	1929	1930
U.S.A.	127,035	151,180	252,288	238,181	278,472	368,328	347,968	165,500
Canada	51,481	43,882	58,005	53,628	39,900	55,612	64,863	31,180
U.K.	4,859	12,961	24,372	26,865	29,503	26,306	33,798	23,208
France	28,604	43,863	56,589	54,675	46,910	39,200	39,121	27,000
Italy	11,243	16,661	25,561	30,091	27,112	24,280	20,100	23,000
Other Countries	15,381	14,081	16,091	18,957	15,400	14,000	10,000	6,000
Total	238,603	282,628	433,006	422,697	437,297	527,726	515,850	275,888

International Exports of Commercial Vehicles. (Units)

Exports From	1923	1924	1925	1926	1927	1928	1929	1930
U.S.A.	24,859	27,542	50,636	66,775	105,456	138,782	198,234	88,560
Canada	12,439	12,774	16,144	20,694	17,513	23,776	36,848	16,088
France	2,319	3,264	4,782	5,093	5,143	4,906	9,904	7,794
Italy	1,507	2,913	3,480	4,103	4,000	4,000	3,589	5,000
U.K.	1,400	2,635	4,649	6,377	6,189	6,471	8,233	6,545
Total	45,524	49,128	76,691	103,037	138,301	177,935	256,808	123,787

Latex-Bonded Brake Lining Has Nearly Friction and Does Not Swell

Proper distribution of the binder in flexible or rigid linings helps to eliminate noise and reduce wear

RESEARCH aimed at the production of a better binder for asbestos as applied to brake linings and clutch facings has for a long time occupied some of the best brains in brake-lining manufacturing companies. This problem also has vitally interested manufacturers of brake mechanisms as well as automotive engineers generally. In this age of flexibility, speed and greater weight in motor transportation, it is not surprising that increased attention has been given to the development of a better brake lining. With an average automobile having an engine capable of accelerating it to 20 m.p.h. in 100 ft. (assuming that all of the engine power were available for acceleration), a braking mechanism and brake lining must be used which will bring it to a stop from 20 m.p.h. in 20 ft.

This is illustrated in the accompanying diagram, Fig. 1, which shows both velocity and acceleration plotted against distance. Neglecting engine compression, friction, windage and other losses, the acceleration-space areas are theoretically measures of kinetic energy. Thus, the sum of areas 1, 2 and 3 should equal area 4. (The acceleration is assumed to be constant for each period, which probably best represents average conditions.)

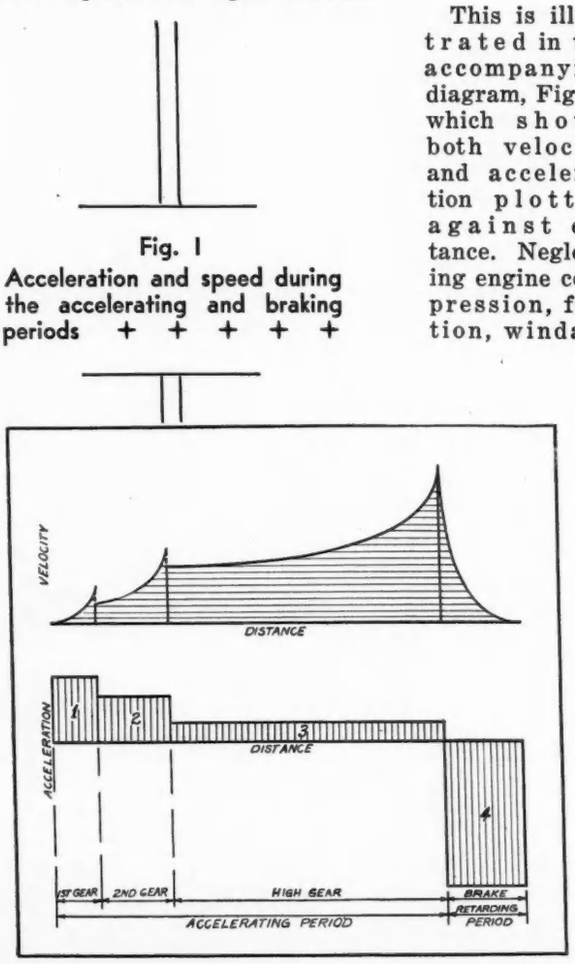


Fig. 1
Acceleration and speed during the accelerating and braking periods + + + + +

While these energy areas are equal for acceleration and deceleration, retardation by the braking mechanism must be limited to one-fifth of the time. In theory then, neglecting all losses, approximately five times the power is absorbed in stopping the car as is applied by the engine in accelerating it to the same speed. For a car equipped with an engine of 100 b.hp., modern standards demand, therefore, that approximately 500 hp. must be dissipated in stopping by the brakes.

In the parts of the automobile which are used for acceleration, the best alloy steels are specified, and these are properly heat-treated for their particular functions. In the braking mechanism, however, frequently only ordinary materials are utilized. While there is a definite trend toward better materials for brake drums, with few exceptions the drums of present-day automobiles are made of soft, low-carbon steel. A great burden of responsibility, therefore, has been placed on the brake lining itself to give the performance that is required.

The search for the ideal brake lining has thus received considerable impetus from these modern trends in the automotive industry. Asbestos is the principal ingredient of brake lining materials, its use being due to its outstanding frictional characteristics as well as to its resistance to destruction at elevated temperatures. It is quite logical, therefore, that research and development have centered around various binders.

To attack this problem properly and intelligently, the characteristics of the ideal binder should be analyzed. These may be enumerated as follows:

1. High tensile strength.
2. Uniform distribution of binder.
3. Uniform frictional characteristics through entire range of temperatures and weather conditions.

Constant Coefficient of

by John A. Lunn
Vice-President, Multibestos Co.

4. Must not cause noise.
5. Low wear factor.
6. Must not cause scoring.
7. No bleeding at high temperatures and pressures.
8. Must not swell at high temperatures so as to cause the brake to bind or to destroy the bond.
9. Must permit good physical and chemical control in manufacture.
10. Good aging characteristics.

The more common binders include asphaltic residues, oxidizable oils, phenol-formaldehyde resins and rubber. Space does not permit a discussion of the relative merits of each of these binding materials. Rubber is one of the best binders, provided a sufficiently small percentage of binder is used. This is evidenced by the wide acceptance of the various rubberized types of brake linings.

The successful use of latex in a multitude of other fields naturally suggested its use as a binder for asbestos. Latex is the natural juice or secretion from the inner bark of certain seed trees or plants. Its most common source is the Hevea Braziliensis or para rubber tree. This is practically the only tree which yields latex in sufficient quantities to make the extraction process commercial. Latex has been available in commercial quantities in the United States only since 1922. It is shipped from the tropics, after a preservative has been added, in special tank steamers, having been pumped with glass-lined pumps to prevent contamination. The technique of latex transportation and utilization forms one of the most romantic chapters in modern chemical development and research.

Structure of Latex

In order to analyze the effects of various steps in the production processes on the ultimate product, it is necessary to know something about the original structure of latex. Latex itself consists of minute particles of hydrocarbon in suspension in a watery serum. The soft, resilient central mass of this particle is surrounded by a dense, tough skin. The molecules are in turn connected in a chain-like structure. Upon the continuity of this chain depend the properties of resilience, elongation, toughness, resistance to abrasion, and excellent aging characteristics which are so well known in latex products. The factors which tend to cause a breakdown of the chain structure and may cause ultimate depolymerization are:

a. Milling operations.
b. Solution in volatile solvents.

It is not surprising to find that properly cured latex products, the manufacturing processes of which do not involve these operations, have a higher tensile strength than milled rubber products. The chain structure is unbroken and the process is further assisted by the presence of natural activating agents. The strength is equal in all directions, as is the resistance to tearing, this being due to the lack of calender grain. The much greater resistance of latex products to abrasion, as compared to milled-rubber compounds, has been proved by actual tests.

Fig. 2—Untreated asbestos fibers.

Fig. 3—Latex particles brought into consociation with asbestos.

Fig. 4—A sample of asbestos treated with dissolved rubber. Magnified 60 times + + + +

The factor which probably has the most far-reaching effect on the ultimate characteristics of finished brake lining is the uniformity of distribution of the binder. In the case of latex there is a very definite deposition or precipitation on the asbestos fibers. The three photomicrographs Figs. 2, 3 and 4 illustrate this very clearly.

Fig. 2 shows untreated asbestos fibers with numerous fine hairlike fibers tending to lie in parallel arrangement. This line-up is readily disturbed, of course, by various steps in the process. Fig. 3 shows latex particles brought into consociation with asbestos. The small white dots along the fibers are particles of latex. Note the uniformity of their distribution along the entire length of the thread-like asbestos fibers. Fig. 4 is made from a sample of asbestos treated with dissolved rubber. Here the masses of rubber are so large that they show dark in the field. The agglomerated masses are large, and are deposited non-uniformly throughout. At the bottom of the picture lie sticky, rubber-enfolded, fiber bundles which can be distinguished from the blur of the mixture. At the top is rubber only, and in the center a mixture of the two.

While these photomicrographs represent the first

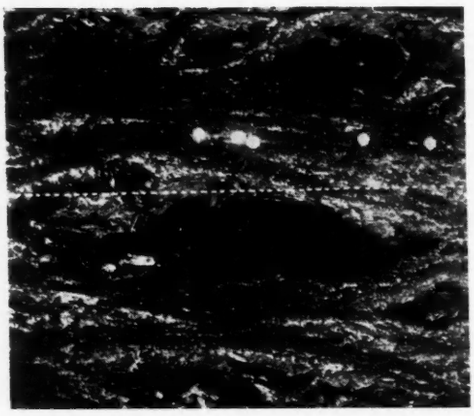


Fig. 5

Four photomicrographs of cross-sections of various molded brake linings, after subjection to a temperature of 600 deg. Fahr. for three hours. Fig. 8 is a latex-bonded lining + + +

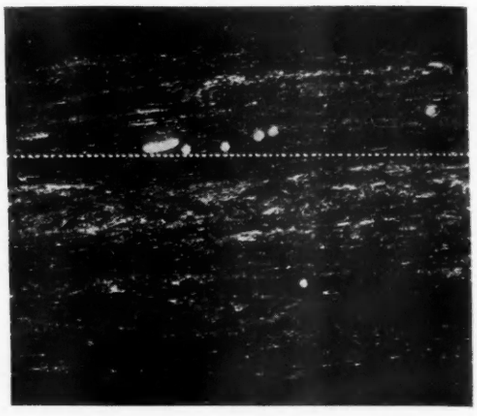


Fig. 6

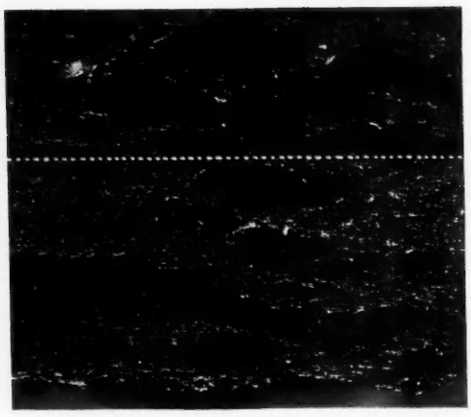


Fig. 7

Fig. 8

stage in the deposition of the binder on the asbestos fibers, it is reasonable to suppose that the ultimate product will carry the same uniformity in the case of latex distribution as is shown here. Numerous laboratory tests have proved this to be the case.

Many of the other very desirable characteristics of finished brake lining are directly attributable to this uniformity of distribution of the bonding agent. It follows that the coefficient of friction is very nearly constant throughout the temperature ranges encountered in normal braking action. This is a most desirable feature from the standpoint of securing optimum brake performance with any design of mechanism.

The technical explanation of the elimination of brake grab with latex-bonded brake lining is not readily apparent. Extensive road tests on hundreds of cars have definitely proved that after being completely wetted, the return to normal holding ability is very rapid, and there is no tendency to exceed normal deceleration with normal pedal pressure. This is a most important characteristic, particularly in the case of private cars in damp climates and wet weather.

The lack of noise and low wear factor of latex-bonded brake lining in both the flexible and rigid forms follow directly the feature of proper distribution of binder and the resultant effect upon the frictional characteristics. It is logical to suppose that chatter and noise may be caused by variations in the coefficient of friction over the area of a segment of a lining. They are, of course, aggravated by poor adherence to the contour of the brake shoes. The wearing characteristics are vastly improved by the lack of non-uniform sections either at the surface of the lining or throughout its thickness as uncovered by progressive wear. The continual exposure of new bearing surfaces of uniform structure without any tendency to glaze makes for the best possible results.

Many theories have been advanced as to the various factors which contribute to the scoring of brake drums. Without attempting to discuss the composition of the drums themselves, it is worth noting that drum materials which contain uncombined carbon inhibit scoring. In all probability the presence of hard particles in the raw materials used for brake linings has some effect. This suggests careful selection and meticulous cleaning and control of these materials. In the normal action of a braking mechanism there is a very definite wear of the brake drum as well as the lining, in addition to the corrosion and oxidation which occur. This is evidenced by the large volumes of iron that are present in the dust removed from brake drums. The fusing together of these particles, assisted by the action of heat and pressure, produces masses that will cause rapid scoring. A binder which will delay or prevent this fusing action is most desirable. It is also possible that the lack of uniform frictional characteristics may start local scoring which will progress rapidly. The exceptionally low scoring tendency of latex-bonded brake lining at high pressures and temperatures is one of its outstanding and salient features.

The use of latex as a binder precludes the possi-

bility of bleeding at high temperatures and pressures. Surface temperatures in excess of 600 deg. Fahr. have been observed in actual tests. The disastrous effects of binders which do bleed under severe service conditions are well known. The breakdown of the bond in brake linings at high temperatures, as indicated by swelling tests, also has serious consequences. While an oven-swelling test is not indicative of what may actually occur on a brake shoe, owing to the pressure applied during the generation of heat, it is a very definite proof of the breakdown of the binder, and when the bond of a brake lining is definitely broken, its "days are numbered" as far as useful life and wear are concerned. The photomicrographs (Figs. 5, 6, 7 and 8) show cross-sections of various molded brake linings, after having been subjected to a temperature of 600 deg. Fahr. for a period of three hours. The distance between the dotted line and the top edge of each picture illustrates the degree of swelling (all samples having been identical in thickness before being subjected to the test). The outstanding superiority of latex-bonded lining (Fig. 8) is obvious.

The factors of proper physical and chemical control in manufacture cannot be too strongly stressed. The question of selection, subsequent opening and most careful cleaning of the asbestos fibers has been discussed already. The careful choice of the source of the bonding material is equally important.

The question of the aging properties of latex products also has been briefly discussed and is of prime importance. This is particularly true of the flexible molded lining. The shelf life of these materials affects the automotive manufacturer as well as the distributor for replacement. The absence of milling operations and solution in volatile solvents assures years of flexibility and unchanged characteristics for latex-bonded brake lining.

Shrinkage of 7% in British Automobile Production is First Drop Since 1923

(Continued from page 269)

To effect this increase of about 62,000 in the number of cars registered, 157,803 new cars had to be sold. It is thus seen that nearly 100,000 of the cars registered in 1929 were not registered in 1930. Many of these, of course, were scrapped, but it is believed that a considerable proportion of the number were not registered on account of the hard times.

Imports of foreign passenger cars into Great Britain during the year declined considerably more than the British exports of such cars. The number of complete passenger cars imported decreased from 11,416 to 6936; that of passenger-car chassis imported, from 10,115 to 2880, and of the two combined, from 21,531 to 9816. This decline in the imports of foreign cars is traceable largely to the establishment of manufacturing plants in Great Britain by non-British manufacturers. Both Ford and General Motors are said to be making progress in their plans for the complete production of their popular vehicles in Great Britain, and this has helped to increase the proportion of the British home market which was filled last year from local factories.

How the various manufacturing countries fared in the export markets during the past year can best be seen from the two tables of exports of private cars and commercial vehicles reproduced herewith. United States exports of passenger cars decreased somewhat more than the total export figures—52.5 per cent as compared with 46.5 per cent. It may be that hard times throughout the world last year induced additional purchasers to turn to the European small cars.

A rather remarkable showing was made by the British commercial vehicle industry, which increased its production in the course of the year from 57,576 to 66,859 vehicles. Imports of foreign commercial vehicles declined heavily. In previous years there had been large imports of light delivery trucks from the United States, and at present there seems to be a tendency toward the medium-sized trucks. Exports of British commercial vehicles declined during the year, hence the gain in sales of British commercial vehicles at home must have been greater than the gain in production.

Commercial vehicles registered in Great Britain increased from 458,010 in 1929 to 466,188, or by only about 8000. To achieve this increase in the number of vehicles in service, 66,343 new vehicles were sold, of which 1328 were imported, as compared with 16,253 the previous year. In view of the increase in the number of commercial vehicles produced in the United Kingdom in 1930 in spite of the depression and the tremendous drop in the number imported, one is inclined to believe that the American makers who formerly supplied the bulk of the light delivery cars now build or assemble these cars in Great Britain. This view is supported by the fact that not very long ago a letter appeared in one of our English contemporaries protesting against reference to the Chevrolet as a foreign car, since the latter was now a British product.

The imposition of the McKenna duties in 1927 seems to have practically put a stop to the importation of complete commercial vehicles into Great Britain, the number decreasing that year from 632 to 93, but the importation of commercial vehicle chassis continued to increase, and attained a peak value of 16,205 last year, from which it dropped this year to 1291.

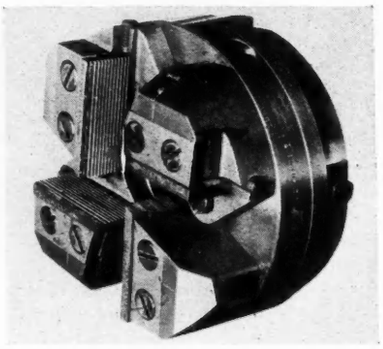
Summarizing the situation at the beginning of 1931, *Engineering* finds that the outlook is not particularly good. The recession of 1930 was no doubt in part a reaction from the boom of 1929, which was not on a sound basis, at least as far as the private car is concerned. There is some evidence to the effect that the excesses of 1929 were not fully liquidated in Great Britain in 1930 and that 1931 will not show a substantial improvement. Some disturbance is expected from the completion of the large new Ford works in England. This will probably result in a redistribution of the English home market without increasing that market, but it is likely to materially increase automobile exports from Great Britain.

NEW DEVELOPMENTS—AUTOMOTIVE

Landis Solid Adjustable Die Head

THE Landis Machine Co., Inc., Waynesboro, Penna., has placed on the market a new solid adjustable die head for application to the various types of special automatic machines with power feed and head reversing mechanism now used for threading pipe fittings and valves.

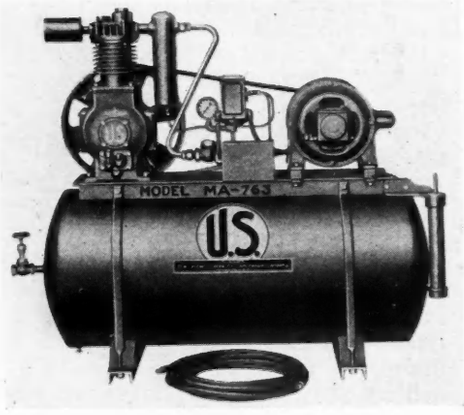
This die head is available in the ¾ in., 2 in. and 4 in. sizes. It is compact in design and covers a wide range. The assembly consists of four major parts, all of which are made of high carbon steel, heat-treated and ground.



The adjustment for size is effected by two adjusting screws. These adjusting screws lock the die head and impart a rigidity equal to that of the solid die. This die head employs the patented Landis Chaser.

U.S. Heavy Duty Air Compressors

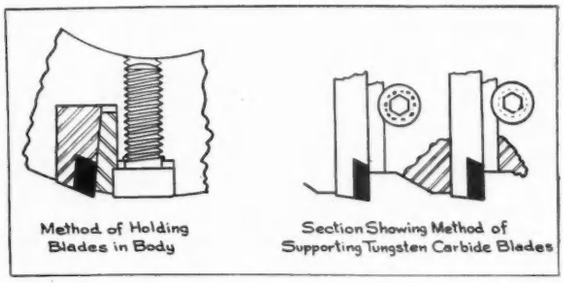
THE United States Air Compressor Co., Cleveland, Ohio, announces a new line of heavy-duty single-stage air compressors. These new units in two models (MA-763—MA-863), are twin-cylinder, single-stage, air-cooled compressors de-



signed for requirements demanding a large volume of air at a maximum pressure of 150 lb. Both models are equipped with Timken bearings. The U. S. Dual Ring lubrication system insures positive lubrication at all required points.

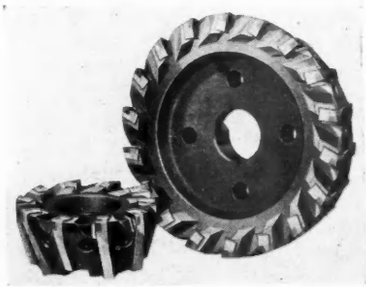
Kearney & Trecker Tungsten Carbide Milling Cutter

AMPLE strength and rigidity, permitting full use of the high cutting speeds and feeds of cemented tungsten carbide, have been basically embodied in a face milling cutter known as the full-back blade type, now being marketed by the Kearney & Trecker Corp., Milwaukee, Wis.



Instead of having the blades project beyond the face of the cutter body, they are set practically flush with this face, whereas chip clearance is attained by cutting suitable slots in the body for each individual blade.

The cutter can be furnished in sizes ranging from 5 to 14-in. in diameter, either left or right hand, with blades that are applicable for medium and semi-roughing, or finishing cuts. Their design is suited for the milling of cast-iron, semi-steel, malleable iron, bronze, copper, and aluminum.



The cutter body is made from an extra-heavy steel forging that is heat-treated, hardened, and ground to insure long life. Each blade is made with a tapered face and held in place by a wedge having a corresponding taper, forming a positive lock that prevents loosening in the body. Hardened screws are used to hold the wedges in place. The use of hardened steel pins in the cutter body, which in turn fit into cross slots machined in the blades, eliminates the possibility of end slippage. One pin is used for each blade, but by having a series of five holes in each body slot and four cross slots in each blade, adjustments can be made in increments of 1/16-in.

PARTS, ACCESSORIES AND PRODUCTION TOOLS

Economy Electric Lifting Machines

A NEW line of ball-bearing-equipped lifting machines has been placed on the market by the Economy Engineering Co., Chicago, Ill. Both hand and power operated, plain and telescoping machines are included in the new development, the machine shown being an Electric Telescoper of the new type. Ball-bearings, in these new models, are used throughout the gearing and in the sheave and platform frame wheels. On the Telescopers the sliding frame wheels are also equipped. Friction is further reduced through recently designed flangeless guide wheels which are used to support the platform and telescoping frames.

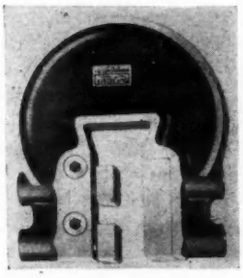
The electric machines are equipped with high torque motors of ½, 1, 2, 3 hp. or more, depend- on the speed of operation. All are controlled, unless otherwise specified, by means of a single lever drum switch. A lever attached to the rear of the controller shaft operates the service brake,

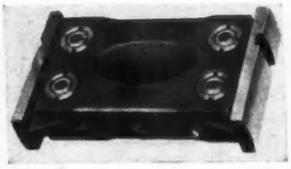
insuring prompt application at all times. Automatic limit stops prevent overtravel of platform by returning control lever to "Stop" position, thereby stopping motor and setting brake.

Taft-Peirce Snap Gages

FOLLOWING recent improvements in their machine tool products, the Taft-Peirce Manufacturing Co., Woonsocket, R. I., announces two new gages. One is an adjustable flat plug gage for measuring large internal diameters, and the other an adjustable snap gage for checking shoulder work.

The flat plug gage incorporates all of the economies of adjustable gaging members. It consists of a well designed and balanced body, shaped to fit the hand conveniently. Its gaging members are the outstanding feature. By an eccentric adjustment they can be expanded, locked, and then reground to original size. Both types are made from a special hard steel which gives long wearing qualities and the interchange-





able members can be replaced; hence the life of the gage is unlimited. Expansion of ⅛ in. is provided to allow a generous number of regrinds.

The adjustable snap gage is designed for checking flat or cylindrical work of plain sections or shoulder work up to a sharp corner as well.

The adjustable member has two square anvils which can be set to any desired limits within its range. A newly designed clamping device locks the anvils securely so that no variation is possible after sealing. The stationary member is rigidly bolted to the frame which is specially designed for convenient handling.

Bendix-Stromberg Aircraft Carburetor

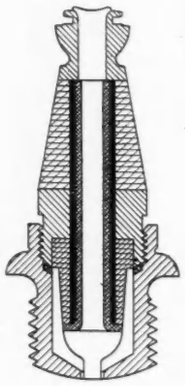
THE Bendix-Stromberg Carburetor Co. announces a new small compact aircraft carburetor for two, three and four-cylinder engines, as used on small airplanes and power gliders. This carburetor weighs only 2½ lb. and is only 4¼ in. high. At the present time there are two models available, the NA-S2 for engines of 50 hp. or less, and the NA-S3 for engines of 50 to 95 hp.

The mixture requirements of this type of engine permit the application of a very small type of carburetor. No economizer, accelerating pump, or mixture control is needed. A special throttle valve body, incorporating a back suction type of mixture control, can be furnished as an extra for application where it is desirable.

NEW DEVELOPMENTS
Automotive Parts, Accessories and Production Tools

H-T Copper-Cooled Spark Plug

A SPARK plug for aircraft engines in which the central electrode is cooled by a copper tube surrounding it has been placed on the market by Hurley-Townsend Corp., 305 East Forty-fifth St., New York. It is held by Roy T. Hurley, the inventor of this plug, that engine compression is definitely limited by the fact that the spark plug nose gets so hot that it explodes the gas before the point of maximum compression or that of the spark advance for maximum efficiency has been reached. To remedy this, spark plug noses have been made shorter and shorter, but this, unfortunately, increases the danger of the spark plug becoming fouled.

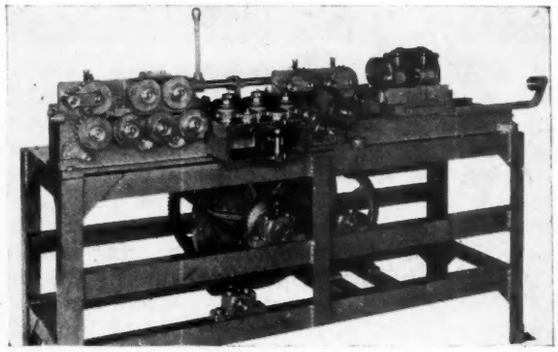


Copper has a heat conductivity about ten times as great as that of steel, and in the H-T plug the heat which is absorbed from the burning gases by the head of the central electrode is carried away rapidly to the outer end of the plug by the copper jacket, so that the head does not reach so high a temperature. The better heat conductivity of the assembly made it possible to considerably enlarge the center electrode. In the process of manufacture, as the center electrode is forced through the copper tube, the latter is expanded into intimate contact with the mica washers, which is claimed to form a positive seal extending over the entire length of the electrode.

Straightening and Cutting Machine For Copper Tubing

TO meet the need for equipment to speed up the operation of straightening and cutting copper tubing, the type "TC" automatic copper tube straightening, measuring and cutting machine has been placed on the market by the Artos Engineering Co., Milwaukee, Wis.

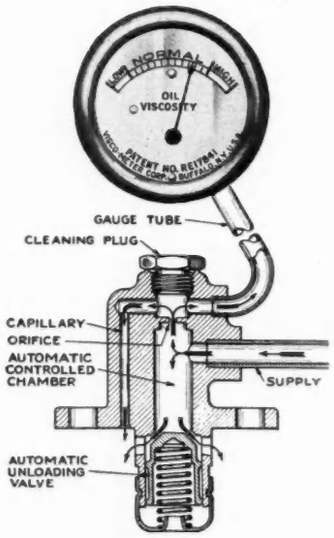
The end of a coil of tubing is inserted in the feeding rollers of the machine and the entire operation of feeding, straightening, measuring and cutting is automatic. The feeding speed is about 50 ft. per min. but actual production is dependent on the length of pieces to be cut. For example, for 12-in. lengths the production is approximately 22 pieces per minute, and for 24-in. lengths it is about 15 pieces per minute. The machine is easily adjustable for any cutting length up to and including 6 ft. If so desired, the machine can be built for any cutting length within commercial requirements. An attachment can be provided whereby the first end of the coil of tubing is trimmed off automatically before the first piece is cut to length. The machine is



also well suited for handling copper tubings such as are used for feed pipes in automobiles. Machines are furnished with a main driving motor and an individual motor-driven circular saw.

Visco-Meter for Crankcase Oil

THE accompanying cut shows a sectional view of the Visco-Meter, manufactured by the Visco-Meter Corp. of Buffalo, N. Y., and designed to give the car and truck operator a visual indication of the viscosity of his crankcase oil. The instrument is connected with the oil pressure line at a point where the oil pressure exceeds 8 lb. p. sq. in. An automatic unloading valve reduces the pressure on a small quantity of oil in the central chamber to 5 lb. p. sq. in. The oil then passes through a calibrated orifice to an upper chamber, from which there are two outlets, one through a calibrated capillary resistance tube, the other to a registering gage which is usually placed on the instrument board.



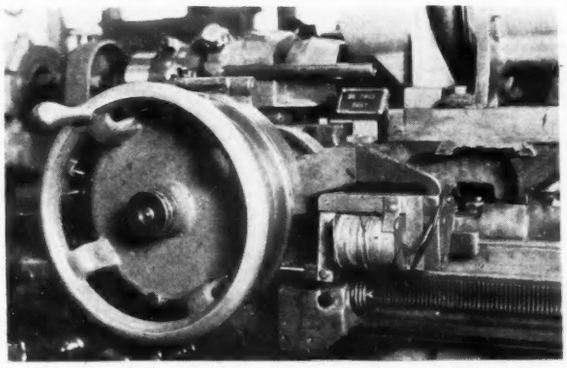
Light-bodied oil passes through the capillary tube freely, hence little pressure can be built up in the upper chamber and the gage indicates a low viscosity. When the oil is "heavy" or more viscous, a greater pressure is built up in the upper chamber and a higher viscosity is indicated by the gage.

The instrument serves to indicate to the operator when it is time to renew his oil supply. An industrial type of Visco-Meter is also being made, for rapid viscosity tests.

NEW DEVELOPMENTS
Automotive Parts, Accessories and Production Tools

Sparking Out Attachments for Heald Internal Grinders

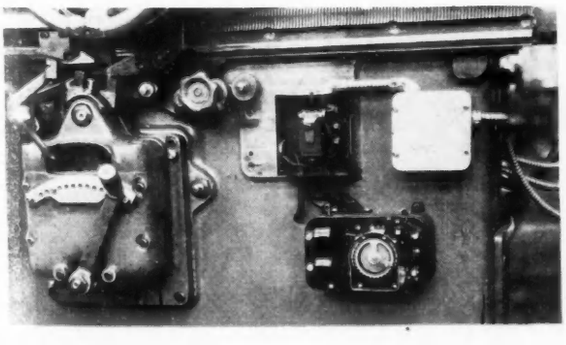
ON high precision internal grinding jobs requiring fine finish it is a well-known fact that after the feed of the machine has been discontinued a certain period of time is required



for the wheel to spark out. This sparking out is the natural dying out of a transverse pressure that is built up between the wheel and the work by the in-feeding function and takes the form of a very minute spindle deflection.

Taking advantage of this condition, the Heald Machine Co., Worcester, Mass., has developed "Sparking Out Attachments" for the Gage-Matic and Size-Matic Internal Grinding Machines which it manufactures. By automatically interrupting the cross feed and allowing sufficient time for the pressure present in the spindle to dissipate itself naturally as the wheel is reciprocated in the bore of the piece being ground, these attachments aid the machines materially in producing remarkably accurate and finely finished holes.

On the Gage-Matic, when the roughing gage enters, besides causing the wheel to withdraw for dressing, an electrical contact is made which actuates an electro magnet (see Fig. 1) on the cross slide unit, disengaging the feed pawl and holding it out of engagement with the feed ratchet throughout the finishing cycle. In other words the cross feed is automatically disengaged after roughing and the hole brought to size by the pressure remaining between the wheel and the work. The time required for the sparking out is governed by the amount of stock left in the hole after roughing and the adjustment of the truing diamond. Inasmuch as the roughing gage constitutes a definite and constant limit the amount of stock remaining can be held to a very small amount and hence the sparking out time to a correspondingly short period. An electrical connection between the coil of the magnet and the toggle switch on the control box of the machine serves to keep the magnet operative and hence the feed pawl disengaged until the finishing passes of the wheel have been completed and the table run out to rest position.

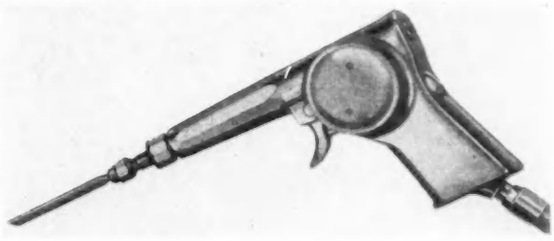


On the Size-Matic the attachment consists of a time relay mounted on the machine to regulate the sparking out time, and a cam attached to the top of the fine feed cam on the handwheel to stop the feed just after the finish contact on the handwheel is made. (See Fig. 2.) The machine operates in the usual manner, except that when the finishing contact is made it engages the time relay instead of tripping the table dog, and the grinding wheel continues to reciprocate in the work without feeding. After a predetermined length of time, the time relay trips the table dog, which runs out the table to rest position.

For fussy jobs on the Gage-Matic where production is disregarded and maximum finish is required, it is desirable to add a time relay (similar to that used on the Size-Matic) and a backing off attachment to lift the wheel from the ground surface before withdrawal. On the Size-Matic, for similar work, the backing off attachment is also desirable.

Madison-Kipp Air Filer

ACCORDING to a recent announcement, the Kipp air filer has been added to the line of pneumatic tools developed by the Madison-Kipp



Corp. of Madison, Wis. Air propelled, this tool operates at speeds from 500 to 5000 strokes per minute, depending upon the amount of air admitted by the trigger valve. Kipp filers are held by means of a hand-operated collet at the end of the spindle. Many different shaped files are available and can be quickly inserted and removed by the operator to suit his work. Operation is similar to that of the Air Chipper described in a recent issue of this publication.

The weight of the tool is one and one-half pounds; the length is seven inches.

Automotive Oddities—By Pete Keenan

THE MUSICAL AD 1906.
Eve-ry body works but father He drives a CADILLAC CAR
LINDBERGH WENT SO FAST IN ESTABLISHING A NEW TRANSCONTINENTAL SPEED RECORD EASTWARD THAT HE DESTROYED HIS OFFICIAL RECORD.
(Excessive vibration broke his barograph)
THE MODEL AUTO TOWN
Radburn N.J. Has Special Streets for Pedestrians and has no Street Crossings.
THE FIRST BUS WAS A MACK, AND THE FIRST MACK WAS A BUS.
This bus built in 1900, has travelled nearly a million miles during its life of service.
THE FIRST PNEUMATIC TIRE EVER INVENTED WAS A BALLOON TIRE.
Thompson 1845.
Pete Keenan

NEWS OF THE INDUSTRY

Registrations Gain In Canada for 1930

Increase of 45,393 Units Brings Them to Record Figure

TORONTO, ONT., Feb. 17—Registration of motor vehicles in Canada during the year 1930 reached the highest figure in the history of the Dominion, according to a report of automobile statistics made public today by John Atkins' Statistical Service of Oakville, Ont. Despite the abnormally low sale of new cars, total registrations for 1930 amounted to 1,222,932, representing an increase over 1929 of 45,393 units. Of the total registrations, 1,056,078 were passenger cars and 166,854 commercial cars.

Increases in both passenger and commercial car registrations were shown by eight out of the nine provinces, the exception being Saskatchewan, where an apparent decrease of 1309 units is shown on available figures. Of the eight provinces showing gains, Ontario heads the list with an increase of 22,068 registrations; Quebec is second with a gain of 9440; British Columbia comes third with a gain of 3287; Alberta fourth with a gain of 3126; Nova Scotia fifth with a gain of 2991; New Brunswick sixth with a gain of 2752; Manitoba seventh with a gain of 1733, and Prince Edward Island eighth with 1305 gain.

Offers Snap Spokes

DETROIT, Feb. 18—Budd Wheel Co. has announced that it has available for a number of the larger production cars snap spoke equipment of stainless steel. These spokes snap over the regulation spokes of wire wheels on cars in the field. The appearance of a wheel with solid stainless steel spokes is thereby produced at fairly low cost. The snap spokes are being sold through Budd distributors and dealers.

Wasp Junior Gets A. T. C.

EAST HARTFORD, CONN., Feb. 18—Approved type certificate No. 66 has been received from the Department of Commerce, Aeronautics Branch, Washington, for the Pratt & Whitney Aircraft Company's Wasp Junior engine.

The News Trailer

By Herbert Hosking

Budd Wheel stockholders increased 130 per cent in 1930 * * * the Detroit outlet of American **Austin** is now a factory branch, **H. D. Braun,** manager * * * "This year will probably be the biggest **preventive** maintenance year in the history of the industry," **W. S. Isherwood** of **AC** * * * Joseph **Maine,** "Bluebird" chassis designer, has developed a new type compression-ignition engine * * * **Perfect Circle** has increased its production schedule **100 per cent** in the past 14 days * * * Bernt **Balchen,** Byrd's pilot on the **T.A.** flight, subbed last week on the New York - **Philadelphia** - Washington Airline's regular **run** * * * 86,000 attended a **General Motors Salon** at Winnipeg, **Canada** * * * New Brunswick legislature is being asked to **enforce** an old law requiring **horse-drawn** vehicles to display a light * * * the **Walkerville,** Ontario, plant of **General Motors** has turned out 100,000 Chevrolet six-cylinder engines * * * the State of **New Jersey** has saved $2,000 on **tire** contracts because of **drop** in crude rubber prices * * * And what do you think of this? **"Denver's** entire traffic squad and all reserves were barely adequate to handle the crowd of over **100,000** people which witnessed the spectacular advertising of the **opening** of Denver's greatest **Auto Show** Sunday afternoon, Feb. 8. Tanks, cavalry and a regiment of the **National Guard** defended a monster **pile** of over two hundred used cars, stacked on a commanding hill overlooking the city, and the National Guard Air Squadron blew the pile sky-high, **setting it afire,** and creating general havoc in spite of the **spectacular defense.** Incidentally the used car problem was eased for some twenty-four dealers, **members** of the Denver Auto Dealers' Association, who **donated** to the cause their worst **wrecks,** and the cars of most ancient **vintage."**

Reduces Engine Weight

DETROIT, Feb. 18—A 10 per cent weight reduction in its A70 aircraft engine is announced by Continental Motors as a result of redesigning the accessory case and crankcase, the former being 3 7/16 in. shorter.

Exports During 1930 Better Than Average

Register Increase of 8.3 Per Cent Over Nine Year Trend

WASHINGTON, Feb. 18—In spite of the unfavorable conditions characterizing the world markets as a result of the marked decline in commodity prices, the United States exports of automotive products totaled $298,814,508 in 1930, an improvement of approximately $23,000,000 or 8.3 per cent over the yearly average for the nine-year period, 1920-1928, according to the Automotive Division, Bureau of Foreign and Domestic Commerce. The year 1929, generally conceded to be an abnormal year from an export standpoint, is eliminated from any compilation for comparative purposes, yet, the past year's shipments were at a level sufficiently high to be only 1.9 per cent under the yearly average for the ten years from 1920 to 1929 inclusive.

In considering the year's total exports, the Division points out, it is necessary to remember that American manufacturers generally adopted a conservative policy regarding foreign business in 1930 and, conscious of the large stocks of vehicles and parts in the dealers hands abroad, curtailed shipments overseas to the minimum of actual market requirements, thus enabling the foreign distributors to dispose of goods on hand and so open the way for increased future business.

It is interesting to note also that, in the case of some companies, their sales abroad did not decrease to the same extent as their exports; in other words, many foreign sales in 1930 were made from the heavy accumulation of stocks on hand at the beginning of the year, the report states.

A review of United States exports of automotive products by commodity groups will appear in the Annual Statistical Issue of *Automotive Industries,* to be published Feb. 28.

Chicago Gasoline Reduced

CHICAGO, Feb. 16—Standard Oil Co. of Indiana and other leading oil companies last week reduced tank wagon and service station gasoline prices 2 cents a gallon throughout the metropolitan Chicago area, effective yesterday.

Sales for the Year 1930 Ended at Slow Tempo

WASHINGTON, Feb. 18—Although the fourth quarter is a seasonally slow automotive sales period, this condition was aggravated by the fact that those overseas markets which ordinarily enjoy their best selling seasons at this time generally failed to maintain their sales record. The following surveys which will be published in *Commerce Reports*, reflect to some extent the dull market conditions in various parts of the world. These brief reviews were compiled from reports submitted by the foreign representatives of the Commerce and State Departments and by the Automotive Division, Bureau of Foreign and Domestic Commerce. They have been prepared also in greater detail for publication in the *Automotive Foreign Trade Manual*, reprints of which are available to all firms listed on the Exporters' Index.

Cuba

Automotive sales were particularly affected during the fourth quarter by the general recession in business conditions. Sales of passenger cars virtually ceased during the final quarter of 1930, and the few that were made consisted almost entirely of the lowest price vehicles.

There was a notable trend throughout 1930 toward cheaper units. A total of 68 per cent of the passenger cars, and 81 per cent of the trucks imported through Habana during the first 11 months of 1930 consisted of low priced vehicles.

Stocks of passenger cars in the popular lines were reported as low, whereas the higher price lines were generally considered high. Likewise, stocks of used cars and trucks were high, and dealers found it almost impossible to move these at any price. For some time past there has been no demand for automobile accessories.

Danzig

Sales of passenger cars and trucks in the Free City during 1930 were about 60 per cent as large as in 1929, while the local distributors and dealers doing business in Poland have not sold more than one-third as many passenger cars in that country as they did in 1929. The B. M. W. is one of the most popular cars now on the market, and with the exception of a low-priced American car, is reported to have been the only one which had better sales in 1930 than in 1929.

The market for trucks up to 2½ ton capacity was somewhat disturbed by the liquidation of stocks of a bankrupt dealer, but unit sales were satisfactory. The heavy truck business was dominated by German manufacturers. Sales of these vehicles did not exceed 15 units, largely Krupp and Hansa Lloyd.

Motorcycle sales in 1930 were believed to have exceeded those of the previous year. Approximately 10 per cent of this business went to American makes, but the principal demand was for lightweight machines with a cylinder content under 200 cc.

Ethiopia

The low exchange value of the silver trade dollar, and the falling off of Government revenue were unfavorable factors in the 1930 automotive year. Many contemplated road construction projects were postponed as there were no funds available for such purposes.

A total of 71 new automobiles were sold in 1930, half of which were of American makes. At the opening of 1930, most of the representative makes of all American and European motor vehicles were established, and no new agencies were taken up during the year. At the present time the market is in its primary stages, and local merchants are not able to meet the servicing requirements which many automobile manufacturers insist upon before granting an agency.

France

The passenger car market for domestic and imported motor vehicles of all grades, especially for medium and high priced makes, was exceptionally dull during the fourth quarter. The October Salon did not stimulate sales to the extent that had been hoped, although it did bring some improvement over the low level of September. In November all sales declined again and in December the market was at a standstill.

New passenger car registrations during 1930 amounted to 160,000, a decline of about 12 per cent as compared with 1929. Sales of American cars were estimated at 11,000, a 25 per cent reduction from the 1929 total. More than 85 per cent of all American cars sold in 1930 were in the low price group, and the rest were medium priced except for about 200 in the high price category.

It was evident at the end of December, that French and other foreign truck sales were far smaller in 1930 than during 1929, and stocks of domestic trucks were believed high. However, imports of assembled and non-assembled trucks were higher in 1930 than in 1929, with the American makes largely responsible for the increase. American truck sales held up better than domestic lines as shown by a registration of about 6700 units, which was believed to have been about the same as in 1929.

Like the rest of the automotive market, motorcycles suffered from decreased industrial activity. The very small machines enjoyed increasing popularity, though the more expensive American models fared better than in past years. Numerically, however, sales of American motorcycles were insignificant.

Portugal

Both the import and sales trend continued to be toward low-priced vehicles, this being evident in registrations of both European and American motor vehicles. Lack of money and credit facilities have been important factors in making for greater sales of low-priced cars. Competition in this class comes mainly from Citroen, Fiat and Austin.

An important increase was registered in truck imports from Germany in the final quarter of 1930; American makes, however, continued to supply the greater part of the demand for all types. There was an increasing use of trucks by commercial houses, private operators and municipal governments. The principal demand was for chassis from 1½-3 ton. There is little demand for trucks with bodies.

New Zealand

Total imports of passenger cars and trucks during the first 11 months of 1930 were 13,369 and 3902, representing a decrease of 40 and 50 per cent as compared with the same period in 1929. Total new registrations for the year were estimated at 15,000 passenger cars and 4300 trucks, which would indicate a normal year's trading, although under the 1929 level. It is believed that sales will decrease in 1931, and that the market will be controlled by a few firms which have a solid financial backing.

The decreased sale of new cars reacted favorably on the used car market. It was estimated at the end of the year that there were not more than 3900 used cars in dealers' hands.

Stocks of new vehicles were at the lowest point for a number of years. From an American standpoint perhaps the most unfavorable trend was the number of dealers who formerly handled only American cars, and who were expanding to take on British lines as well.

Peru

The last quarter of 1930 witnessed a further depressed condition in business circles in general and the automotive market in particular. The import trend was downward, with not more than 12 cars imported into Callao during December 1930 as compared with 147 in the same month of 1929. Monthly sales followed a similar trend, and were between one-fifth and one-quarter of the 1929 figures.

Further depreciation of the currency forced an increase in prices to about 25 per cent higher than in 1929; this coupled with the steadily decreasing purchasing power of the population left many dealers in a precarious position. Stocks on hand were not high, but from the ratio of sales during the fourth quarter, they were ample to meet all requirements for two or three months. Sales of parts and accessories were reported 60-70 per cent of normal.

The low-priced used cars now on the market were reported to have seriously affected the sale of motorcycles.

Porto Rico

After difficulties in 1928 and 1929, the year 1930 was steadier and generally more satisfactory for automotive traders in Porto Rico. New registrations during 1930 were 2226 units, as compared with 2200 in 1929 and 2845 in 1928. Dealers' stocks were greatly reduced, particularly in the case of used vehicles. A notable trend was the concentration of business in a few of the more popular makes and the disappearance of a number of makes from the market. This tendency was indicated by a 15-20 per cent decrease in the dollar volume of sales whereas the unit number increased.

Stocks of passenger cars were reported low. Stocks of parts were likewise satisfactorily low, and early crop money which was put into circulation permitted many car owners to effect repairs. Dealers were very cautious in ordering accessories and service appliances.

in Many Overseas Markets

Poland

Dealer mortality assumed serious proportions during the fourth quarter. In a number of cases, finance corporations had to take over dealer establishments. The reduced number of dealers, and the cautious policy which must be followed by finance companies were expected to curtail sales in the early months of 1931.

Bus and truck registrations held up much better than those of passenger cars. The demand was almost entirely confined to light types. The "Ursus" works which entered into a manufacturing agreement with the Saurer concern of Switzerland, had not yet begun production of the new line. The principal difficulty which American manufacturers faced, exclusive of the passenger car makers having commercial lines, was in finding adequate representatives for their products.

The market for service appliances, after a steady expansion during recent years, suffered a serious setback in 1930 owing to the financial difficulties of car dealers operating service stations. The bulk of the garage equipment now in use is of American origin. European competition is principally in the accessories field and is largely a matter of credits and price.

Turkey

As a result of the advanced season and the anticipated unfavorable weather and road conditions throughout the country, car and truck sales in the interior were extremely reduced during the fourth quarter. In the city of Istanbul, the most important automotive center, practically all stocks of cars on hand were liquidated during November. Medium price cars were especially in demand, and several agents imported small readily available stocks.

In general, agents of low price truck chassis regarded their fourth quarter sales as satisfactory, whereas dealers of medium priced chassis reported their sales as unusually low. The latter also claimed that even certain price reductions which they offered to buyers did not stimulate sales. Total sales of all type trucks declined about 40 per cent as compared to the fourth quarter of 1929 due to a combination of circumstances, principally the condition of the highways, and the low prices received for export crops.

At the close of the year, the total number of motor vehicles in the country was estimated at 9000 units, of which about 65 per cent were trucks and buses, the latter consisting almost entirely of light truck chassis equipped with locally built bodies.

United Kingdom

Registrations during October, normally seasonally quiet, showed an unusual advance, totaling 20,720 units as compared with 19,925 for the similar period of 1929. This increase was decidedly in the nature of a surprise to the trade, and following as it did a somewhat similar advance in September, it instilled a spirit of optimism which was carried over into the new year. It is believed that the early announcement of new models by local manufacturers, and the consequent price reductions on old stocks, helped to bring about the increased demand.

One of the most important automotive events during the year was the strengthening of British manufacturers in the home market. Certain changes in styles of models, price reductions, and a more aggressive national sales program made it possible for British producers to keep production close to the 1929 level. At the close of the year, manufacturers of small cars were believed to have substantial orders on hand, and only the medium and more expensive car manufacturers were generally working on a part time basis.

Production of trucks and buses showed an apparent increase during 1930. The truck market is believed to offer great potential sales possibilities. The bus market, however, was uncertain due to the contemplated regulations which would place these vehicles more in competition with the railroads, and remove some of the advantages which they enjoyed, particularly in the case of terminal locations in the Central London District. There were no unusual developments in the motorcycle market.

Budd Expects Improvement

PHILADELPHIA, Feb. 17—Stating that the Edward G. Budd Mfg. Co. has a large volume of business on its books which will be delivered as retail buying is stimulated during the year, Edward G. Budd, president of the company, expressed the opinion at the annual meeting of the stockholders of the company today that business in 1931 would be distinctly better than in 1930.

Directors were reelected. On Feb. 1, 1931, the company had 5730 common stockholders, an increase of 1553 in the last year, it was announced.

To Study Motor Freight

WASHINGTON, Feb. 16—Rapid extension of improved highways in the United States, growth of commercial traffic over the highway system and problems arising in connection with the effectiveness of highway transport in the distribution system are stated as the reasons for a study of highway transportation to be undertaken jointly by the United States Bureau of Public Roads and the Transportation Division of the Bureau of Foreign and Domestic Commerce. The basis of the study will be a field survey of motor freight traffic.

Purchasing Agents to Meet

NEW YORK, Feb. 17—The National Association of Purchasing Agents will hold its annual convention and informal show at the Royal York Hotel, Toronto, Canada, June 8 to 11, inclusive.

Autocar Directors Reelected

ARDMORE, PA., Feb. 16—At the annual meeting of stockholders of the Autocar Company, held Feb. 13, the directors were reelected.

Michigan Employment Drops, Compared to '30

147,715 Workers Active Jan. 15

DETROIT, Feb. 17—In the automobile industry in the state of Michigan as of Jan. 15th there were 147,715 employees, a decrease of 40,174 from the total of 187,889 in January, 1930, according to a report by the State Department of Labor and Industry based on the reports of 42 companies.

The aggregate weekly payroll for the automobile industry in the state during January was $2,130,621, as compared with $3,829,891 in December and $4,571,614 in January, 1930.

The average weekly earnings per capita in the automobile industry were $14.42 in January, $25.60 in December and $24.33 in January, 1930.

States to Improve Roads

WASHINGTON, Feb. 16 — Thirty-eight states will expend more than $650,000,000 for state highways during the current year from funds now available, according to reports received this week by Col. Arthur Woods, chairman of the President's Emergency Committee for Employment. Further construction amounting to more than $225,000,000 will be undertaken this year by these same states provided present states' administration plans are authorized by State Legislatures.

Seiberling Plans New Plant

OAKLAND, CALIF., Feb. 16—Frank A. Seiberling, president of the Seiberling Rubber Co., announced during his recent visit here that he would erect a plant in Oakland costing $2,500,000 "immediately upon the relief of the depression in the automotive industry." The company acquired a 100-acre site of land on Jones Avenue between East Fourteenth Street and the Oakland airport about two years ago.

Proposes Insurance Fund

CHICAGO, Feb. 14—A proposal for a state fund for Illinois to compensate persons injured in automobile accidents and for property damage caused by automobiles is contained in a licensing law submitted to the Assembly at Springfield by Representative Frank Holton of East St. Louis. The bill provides that all persons applying for automobile licenses pay $10 into the proposed fund.

Bendix Shipments Increase

CHICAGO, Feb. 16—January shipments of the products of the Bendix Brake Co., division of Bendix Aviation Corp., were 10 per cent above December, and the latter month was 16 per cent above those of November. This was revealed in a report issued today by Vincent Bendix, president of the parent corporation.

Met. Section Hears Streamlining Discussion

Andrade and Marti Describe Development

NEW YORK, Feb. 19—Streamlining of automobile bodies was the general topic of the S.A.E. Metropolitan Section meeting held last night. The speakers were Julio Andrade, assistant chief designer of the Murray Body Co., and Othmar K. Marti, chief engineer of the American Brown-Boveri Co. Efforts had been made to secure the attendance of Malcolm Campbell, who demonstrated the possibilities of streamlining at Daytona Beach only a short time ago, but he had left for England on Feb. 13.

In advocating the use of streamlined forms for automobile bodies, Mr. Marti took what may be described as an extreme, and Mr. Andrade, a moderate view. The former was associated with Dr. Paul Jaray of the Zeppelin Works, and his talk was concerned mainly with the results obtained with bodies developed by Jaray with the aid of wind-tunnel tests. Comparative tests were made at Zurich, Switzerland, on two Chrysler 72 cars, one with a stock body and the other with a Jaray streamlined body. The car with the streamlined body coasted about 35 per cent farther than the other one; its acceleration over different speed ranges was from 20 to 25 per cent greater (although Mr. Marti admitted that no high degree of accuracy could be claimed for this result, owing to the difficulty of getting two drivers to handle the controls equally in acceleration), and the fuel economy in runs of between 30 and 35 miles along the shores of Lake Zurich was about 40 per cent better.

Other advantages claimed for the streamlined body by Mr. Marti were improved ventilation without objectionable backdraft, greater freedom from vibration, especially at very high speeds, increased floor space (due to the widening of the body so as to include the wheels), greater safety, due to the smooth exterior form without protruding wheels, etc., and visibility at least as good as, if not better, than with the conventional car.

Mr. Andrade said that while many tests had been made in the past on the air resistance of automobiles, this had been done more with a view to obtaining data for the determination of power requirements than with the object of improving body lines. In Europe, efforts had been made to develop body forms by wind tunnel tests but that was so long ago that the forms evolved were not such as could be sold to the American public today. A slide shown of a late design of streamlined sedan looked really very attractive. Mr. Andrade made the point that a better impression could be made on the public in connection with any attempts to beautify automobile bodies if the changes in form involved could be motivated on grounds of utility.

Henry B. Utley

CHICAGO, Feb. 16—Henry B. Utley, a director of International Harvester Co. and until a few weeks ago a vice-president, died last week at Beverly Hills, Calif. He was for many years with the McCormick Harvesting Machinery Co., which was later merged with International.

Oil Distributors to Meet

CHICAGO, Feb. 17 — A nation-wide conference of oil distributors has been called by the American Petroleum Institute and will be held at the Stevens Hotel on March 2-4 to discuss a marketing code.

Met. Section to Hear Marmon

NEW YORK, Feb. 19—At the next meeting of the S.A.E. Metropolitan Section, to be held on March 26, Col. Howard Marmon and Chief Engineer George H. Freers of the Marmon Motor Car Co., will discuss the design of the Marmon 16-cylinder engine for which Col. Marmon was awarded the Moskovics prize by the Metropolitan Section last January.

Armco Adds 2 Departments

MIDDLETOWN, OHIO, Feb. 16—The American Rolling Mill Co. has announced the organization of a pipe manufacturing department in the Middletown Division. C. C. Clarke will be superintendent. The pipe activities of the company will hereafter be under the direction of the spiral welded pipe department (sales division) which has been organized as a separate department of the division. R. C. Beam has been named manager of the department.

Ford of Canada Optimistic

TORONTO, Feb. 16—Regular contracts between the executive and the sales organization of Ford Motor Co. of Canada, Ltd., and periodic inspections of branch assembly plants in both eastern and western Canada, as well as a concentrated publicity drive for spring business, have resulted in increased January business over the comparative period of last year. Assembly branches in Montreal, Toronto, Winnipeg and Vancouver are running at capacity, and the outlook is considered most promising.

Domestic business is playing an important part in the well-being of the company. The recent price reduction, too, already is having a stimulating effect upon the general sales volume. Officials of the company are most optimistic. An increase of 20 per cent in business over 1930 is anticipated.

McNeal Sails for England

J. M. McNeal, European sales manager of the Landis Machine Co., Waynesboro, Pa., sailed Feb. 14 for England, after a three weeks' visit to the home office of the company.

Curtiss-Wright Adds Travel Air Sport-Trainer

Will Be Priced at $3,500 at Wichita, Kan.

NEW YORK, Feb. 18—Curtiss-Wright Corp. has introduced a new Travel Air Sport-Trainer priced at $3,500, fly-away, Wichita, Kan.

This is a two-place, open cockpit, biplane powered with four-cylinder Wright Gypsy 90 hp., air-cooled engine. Equipment with the 125 hp. Kinner or 110 hp. Warner engine is optional.

The plane will take off in less than 400 feet and will climb 600 feet per minute. Cruising speed is 88 miles per hour, with a top speed of 103 miles per hour.

Fuselage construction is of chrome-molybdenum alloy light steel welded. Undercarriage is of split axle type with oleo-spring shock absorbers, semi-balloon wheels and internal expanding brakes. Wing beams and ribs are of spruce and parts are interchangeable, not only within the Sport-Trainer but with many corresponding parts of the Sportsman.

Ailerons are self-balancing and attached directly to rear wing beams. Vertical fin is adjustable on the ground and the horizonal stabilizer is easily adjustable in flight through a worm gear mounted in self-leveling ball bearings. Controls are mounted in ball bearings for easy handling and reduction of wear.

The plane is fitted with dual control with complete instrument panels in both cockpits. Seats and rudder pedals are adjustable, contributing to the comfort and convenience of pilot and passenger.

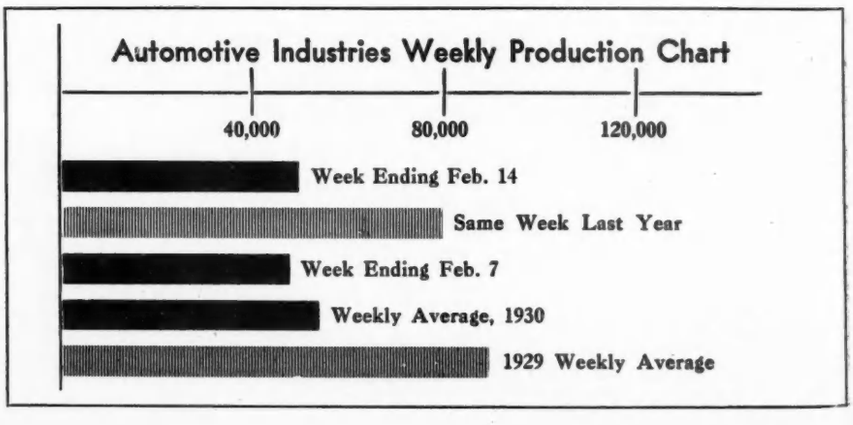
The plane is 21 ft. 5 in. long, 8 ft. 10 in. high, has a wing span of 28 ft. 10 in. and a wing area of 206.4 sq. ft. Gasoline capacity is 33 gallons and oil capacity 2.5 gallons. Total weight empty is 1075 lb. with a gross weight, allowing for passenger, pilot, fuel and oil and extras, of 1725. Wing loading is thus 8.15 lb. per square foot with power loading 17.72 lb. per horsepower.

New England Section Meet

BOSTON, Feb. 16—Dr. A. E. Becker, of the Standard Oil Company of New Jersey, gave a talk to the members of New England Section, Society of Automotive Engineers, Feb. 10, at their monthly meeting at the Hotel Kenmore. His subject was "Cold Weather Starting and Proper Lubrication."

Universal Reduces Air Tariff

CHICAGO, Feb. 16—Universal Air Lines announces that, effective Sunday, fare between St. Louis and Chicago is reduced from $20 to $16.50, with corresponding reductions to Peoria and Springfield.



Legislative Assault On Vehicles Begins

Conference Committee Lists Bills in Process

NEW YORK, Feb. 19—Bills introduced in 42 state legislatures now in session show a pernicious trend toward increased regulation and taxation of buses and trucks, according to a tabulation published by the Motor Vehicle Conference Committee. There are at present 28 bills for increased regulation and taxation of buses; 38 for increased taxation and regulation of trucks; 10 bills increasing weight restrictions and 20 increasing size restrictions. Three states have bills for compulsory insurance laws and seven states propose compensation insurance laws. Eighteen bills are under consideration for proposed increase of gas taxes ranging from 1½ cents to 4 cents a gallon increase and four states are considering laws proposing diversion of gas tax receipts from highways.

There are also six bills pertaining to miscellaneous equipment required on commercial vehicles and passenger cars. Fifteen bills would affect taxation in miscellaneous ways, including increase of miscellaneous taxes, gross revenue taxes and diversion of tax funds to purposes other than for highway uses.

There are also 14 bills of a miscellaneous character including regulation of sale of second-hand cars, parking restrictions, repeal of operators license laws, and inspection of headlights.

Rio Cuts Car Taxes

WASHINGTON, Feb. 17—A material reduction which has been made in the former heavy automobile license fees in Rio de Janeiro is expected to have an important effect upon the sale of automobiles in that part of Brazil, according to advices to the Automotive Division, Department of Commerce, from Assistant Commercial Attache A. Ogden Pierrot, Rio de Janeiro.

Canadian Gasoline Reduced

CALGARY, ALTA., Feb. 16—Retail price on gasoline in Calgary will hereafter be 30 cents a gallon, including the Alberta Provincial Government tax of five cents, officials of Imperial Oil, Ltd., announced today. The price cut is effective today. This is the second reduction of one cent per gallon within the past four months.

Parmelee Enters Minneapolis

NEW YORK, Feb. 18—The Parmelee National Transportation System has added the Minneapolis Yellow Taxicab Co. to its string of operations, thus entering its fifth city, according to E. S. Higgins, vice-president.

Studebaker Enters 80th Year

SOUTH BEND, Feb. 16—Studebaker today celebrates its 79th anniversary. On Feb. 16, 1852, two brothers, Henry and Clem Studebaker, opened a small frontier blacksmith shop on a modest capital of $68. Shortly after the business was established, a third brother, John Studebaker, joined the firm. The first Studebaker gasoline car was built in 1904.

Trailer Company Forming

LAPEER, MICH., Feb. 16—A new company to manufacture truck trailers is being organized here by S. B. Winn and Henry W. Raymond, formerly of the Lapeer Trailer Corp. The company is to be known as the Winn Trailer Corp. and it is expected that production will get under way around May 1. Others of the Lapeer Trailer Corp. who have joined Mr. Winn include James Black, chief draftsman; Joseph Kuttler, chief engineer, and Ralph McCartney, factory superintendent.

Denmark Joins Convention

WASHINGTON, Feb. 16—The International Motor Convention arrived at in Paris in 1925, which is adhered to by the 20 countries whose ratification was necessary for its taking effect, will be put into force as far as Denmark is concerned on Feb. 12, 1931, according to Danish advices received in the Department of Commerce from Acting Commercial Attache Paul H. Pearson, Copenhagen.

Company Officers Retained

TRENTON, N. J., Feb. 18—Thermoid Rubber Co., which recently purchased the Woven Steel Hose & Rubber Co., announces that Horace B. Tobin will continue as president. Robert J. Stokes, president of the Thermoid, is vice-president, and Joseph O. Baur, of the Thermoid Co., has been made secretary-treasurer. The concern manufactures brake lining and other mechanical goods.

Canadian Tire Exports Drop

WASHINGTON, Feb. 16—During the calendar year 1930, Canadian exports of pneumatic casings numbered 1,376,048 as compared with 1,746,950 in the same period of 1929, according to the Rubber Division, Bureau of Foreign and Domestic Commerce. Exports of inner tubes numbered 1,211,042 in the calendar year 1930 as compared to 1,644,719 in the calendar year 1929.

Histed to Distribute Chrysler

CHICAGO, Feb. 16—J. R. Histed, president of the Chicago Auto Trades Association and a director in several corporations, has organized a new company under his name to distribute from Milwaukee the Chrysler line of cars, both wholesale and retail.

Petroleum Imports Drop for a Week

Crude Runs to Stills Reach 2,211,330 Bbl. Daily

NEW YORK, Feb. 18—Imports of petroleum at the principal United States ports for the week ended Feb. 14 totaled 1,300,000 barrels, a daily average of 185,714 barrels, according to the American Petroleum Institute. This compared with 2,326,000 barrels, a daily average of 332,286 barrels for the week ended Feb. 7 and a daily average of 252,679 barrels for the four weeks ended Feb. 14.

Crude runs to stills reported by 95.7 per cent of the estimated capacity were 2,211,300 barrels daily, and these companies had in storage in refineries at the end of the week 42,859,000 barrels of gasoline. During the week, 94.1 per cent of the potential charging capacity of all cracking units manufactured 2,836,000 barrels of cracked gasoline.

Oakland Opens Second Line

DETROIT, Feb. 17—Increased production schedules have required the Oakland Motor Car Co. to place a second assembly line in operation this week, according to George T. Christopher, factory manager.

Employment has increased by the recall to work of 500 former employees during the last fortnight, bringing the total number of men on all payrolls to 6200. Some of the factory divisions are operating night shifts.

Nash Sees Highway Needs

CHICAGO, Feb. 16—Construction of adequate highways and streets in 1931 is of immediate concern to American life and is an economic demand of the automobile industry, C. W. Nash, president of Nash Motors Co., declared upon his return to Kenosha from a tour on which he attended automobile shows in various centers. New and more adequately developed highways, he said, would lead to elimination of the menace of the obsolete car.

Motor Wheel Names Miller

LANSING, Feb. 18—J. B. Siegfried, vice-president in charge of sales of the Motor Wheel Corp., announces the appointment of Wallace T. Miller as assistant general sales manager.

General Tire Declares

NEW YORK, Feb. 18—General Tire & Rubber Co. has declared regular quarterly dividend of $1 payable Feb. 1 to holders of record Jan. 27.

Ford Orders 2 Ships

DETROIT, Feb. 17—Ford Motor Co. has ordered two 300-ft. cargo ships, for service between the Great Lakes and the Atlantic Seaboard.

Men of the Industry and What They Are Doing

Williams Leaves M. & E. A.

J. E. Williams, for the past five years with the sales development department of the Motor and Equipment Association at the New York Office, will sever his connection the latter part of this month.

Mr. Williams has been in charge of the Association's National Automobile show activities in cooperation with the National Automobile Chamber of Commerce, for the past two years, the publication of the M.E.A. Business Bulletin, export bulletins and several market surveys.

Hambly Moves to London

Frank L. Hambly, Marmon export manager, has removed his headquarters from the Marmon factory in Indianapolis to London. From his new headquarters Mr. Hambly will direct Marmon affairs throughout Europe by direct contact with Marmon distributors in the principal countries abroad. He also will remain in close touch with the Marmon factory to supervise export operations in South America and throughout the rest of the world.

Waldron Succeeds Perry

R. G. Waldron, production manager, Hudson Motor Car Co., has succeeded R. S. Perry as general planning manager. Mr. Perry's resignation was announced in last week's issue of *Automotive Industries*.

W. H. Lyman, factory manager of Hudson, has also resigned, and R. Z. Hopkins, formerly assistant factory manager, has been appointed to succeed him.

Ohmer Elects Hubler

At the annual stockholders' meeting held in Rochester, New York, Feb. 9, Colonel Robert L. Hubler of Dayton, Ohio, was elected to the board of directors of the Ohmer Fare Register Co. Colonel Hubler is general sales manager of the company. Other directors were reelected.

Cates Joins Company

Harold F. Cates, formerly plant engineer of Hudson Motor Car Co., has joined Mechanical Handling Systems of Detroit as chief engineer. While Mr. Gates was with Hudson, he supervised the design and installation of conveying equipment and other machinery.

Lawrance Plans New Engine

Charles L. Lawrance, former president of Wright Aeronautical Corp., who resigned from that capacity some time ago in order to conduct research work although still retaining his interest in the Curtiss-Wright Corp., has revealed he is at work on the development of an aircraft engine which will use heavy oil as its fuel. He would not, however, discuss the details of the engine.

Murray Names Drum

Charles Drum, formerly chief inspector of the Murray Corp. of America, has been named general superintendent of the corporation, succeeding William Klan. C. F. Coda, whose appointment as manufacturing manager of the Murray Corp. was announced recently, remains in charge also of the Ecorse plant and Jenks and the Muir Mfg. Co.

Morse Chain Names Two

A. B. Wray, formerly sales manager of the industrial division of the Morse Chain Co., Ithaca, N. Y., and Detroit, has been named chief engineer of that division. W. W. Bertram, formerly manager of the New York office of the company, has been appointed sales manager of the industrial division succeeding Wray.

U. S. Rubber Names Harkins

Appointment of Frank S. Harkins as manager of advertising and sales promotion of the U. S. Rubber Co.'s tire department has been announced by L. M. Simpson, general sales manager of the department, at Detroit.

Jurack Joins Chain Belt

Charles G. Jurack has joined the Chain Belt Co., Milwaukee, in the foundry equipment division. He was formerly with the Milwaukee Foundry Equipment Co. and has spent his whole career in this line of work.

A. L. Frank Returns

A. L. Frank, sales manager of The Studebaker Pierce - Arrow Export Corp., has returned from a six months' trip to Mexico and South American countries.

E. P. Warner Marries

Edward P. Warner, who has just completed a term as president of the Society of Automotive Engineers, was married Feb. 13 to Miss Mary Joan Potter, at Boston, Mass.

Hollister Leaves Auburn

Don C. Hollister has resigned his position in the body designing department of the Auburn Automobile Company.

Buhl Producing New Light Plane

Uses Szekely 45 Hp. Air - Cooled Engine

DETROIT, Feb. 18—A new light plane, the "Bull Pup," is being put into production by Buhl Aircraft Corp., of Marysville, Mich. It is to sell at the low price of $1,250. The ship is a single seater monoplane having a gross weight of around 850 lbs., of which approximately 305 lbs. is useful load, including a 10-gal. gasoline and 6-qt. oil supply.

The ship has been engineered for quantity production, having a monocoque dural fuselage and conventional wood, fabric covered, wings. In the production of the ship, advantage will be taken of the facilities of the Buhl Stamping Campony of Detroit for the manufacture of the metal parts, representing better than 50 per cent of the ship.

The first of these planes, illustrated herewith, is equipped with a Szekely three-cylinder 45-hp. air cooled engine. The ship, the company states, is designed to take a variety of other engines, however, ranging from 40 to 80 hp.

While Department of Commerce tests for an approved type certificate have not yet been completed, the manufacturers are guaranteeing a top speed of 92 miles per hour with the ship as now built, and a landing speed of 35 miles per hour.

May Import More Gasoline

WASHINGTON, Feb. 17 — An increase of one-tenth has been made in the quantities of gasoline and gas oils which figure in the decrees of special authorizations for importation from the first of July, 1931, according to advices received in the Department of Commerce from Assistant Trade Commissioner Earle C. Taylor, Paris. This change will be in force for the six months following.

Chain Belt Reports Assets

CHICAGO, Feb. 16—Chain Belt Co. balance sheet as of Dec. 31, 1930, shows current assets of $3,098,689, or 8.7 times current liabilities, including all tax reserves of $356,099. The ratio a year ago was 5.3 to 1.

Cash and marketable securities are $1,255,771, equivalent to $10.46 per share of common, compared to $4.01 a year ago. Net tangible assets were equivalent to $35.54 per share.

Vogt Reports Profit

CHICAGO, Feb. 16—The Vogt Mfg. Corp. for the year ended Dec. 31 reported a net profit of $216,222 after charges on taxes, equal to $2.16 a share on 100,000 shares of capital stock, as against $405,173, or $4.05 a share, in 1929.

Barth Takes Vacation

C. F. Barth, vice-president in charge of the Flint plant of the Chevrolet Motor Co., sailed last week on the S. S. California for a trip, via Panama and the Canal Zone, to California.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

NEW YORK, Feb. 18—There was no significant improvement in general trade last week. Wholesale and jobbing orders were mostly smaller. Many firms are expecting an early Easter trade this year. A more cheerful tone was evident in some lines of trade and industry, which was based to some extent on the active and rising stock market.

DEPARTMENT STORE SALES

Department store sales during January, according to the preliminary report of the Federal Reserve Board, were 7 per cent smaller than those a year ago.

CHAIN STORE SALES

Sales of 33 store chains during January amounted to $143,173,094, as against $146,351,767 a year ago.

FARM PRICE INDEX

The index of the general level of farm prices on Jan. 15 stood at 94 per cent of the pre-war level, as against 97 per cent a month earlier and 134 per cent a year earlier.

COTTON CLOTH OUTPUT

Production of standard cotton cloth during January amounted to 202,149,000 yds. Sales were equivalent to 118.3 per cent and shipments to 104.2 per cent of production.

CONSTRUCTION AWARDS

Construction contracts awarded during January in 37 Eastern States, according to the F. W. Dodge Corp., amounted to $227,965,400, as against $323,975,200 a year ago. Three of the thirteen territories included in this report showed gains above the contracts awarded both in the preceding month and a year ago.

CRUDE OIL OUTPUT

Average daily crude oil production for the week ended Feb. 7 amounted to 2,116,500 bbl., as against 2,085,950 bbl. for the preceding week and 2,613,800 bbl. for the corresponding week last year.

CAR LOADINGS

Railway freight loadings during the week ended Jan. 31 totaled 719,281 cars, which marks a decrease of 179,554 cars below those a year ago and a decrease of 227,873 cars below those two years ago.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended Feb. 14 stood at 76.3, as against 76.4 the week before and 77.2 two weeks before.

BANK DEBITS

Bank debits to individual accounts outside of New York City for the week ended Feb. 11 were 14 per cent below those in the corresponding period last year.

STOCK MARKET

The stock market last week was marked by evidence of great enthusiasm and a sharp upward movement of prices. The volume of trading was on an increased scale. Although there was some reaction toward the end of the week, prices all around showed net advances, while gains in some issues were very large.

BROKERS' LOANS

Brokers' loans in New York City during the week ended Feb. 11 increased $33,000,000. This increase follows a total decline of $1,506,000,000 during the 19 preceding weeks.

FEDERAL RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended Feb. 11 showed decreases of $1,000,000 in holdings of discounted bills and of $16,000,000 in holdings of bills bought in the open market. Holdings of Government securities showed practically no change. The reserve ratio on Feb. 11 was 83.5 per cent, as against 82.9 per cent a week earlier and 82.7 per cent two weeks earlier.

Air Race Officials to Meet

CLEVELAND, Feb. 18—Clifford W. Henderson, managing director of the National Air Races, pilots, aeronautical engineers and executives will meet at the Hotel Cleveland on Friday evening, Feb. 20, to start drafting the program for 1931. Other regional meetings will be held before the program is completed.

Canadian Rubber Association Elects

MONTREAL, Feb. 16—The eleventh annual meeting of the Rubber Association of Canada took place in Montreal the past week when the following officers were elected: C. A. Jones, of the Seiberling Rubber Co., Toronto; J. H. Coffing, Jr., vice-president; C. N. Candee, treasurer; H. C. Jeffries, assistant treasurer; C. A. Jones, W. A. Eden, F. L. Freudeman, John Westren, E. S. Sargent, W. H. Miner, C. H. Carlisle, E. W. BeShaw, and J. H. Coffing, Jr., directors.

On the evening of the same day a dinner was held at the Mount Royal Hotel with W. A. Eden, the retiring president, as chairman. The chief speaker of the evening was the Hon. W. A. Gordon, Minister of Immigration and Colonization and Mines.

Henry M. Wallis

RACINE, WIS., Feb. 16—Henry M. Wallis, pioneer tractor manufacturer and prominent retired industrialist of Racine, died Feb. 6 from injuries sustained in an accident Nov. 11. He was born in White Pigeon, Mich., June 24, 1861, his mother being the daughter of Henry Mitchell, founder of the Mitchell-Lewis Wagon Co., Racine, which later became the Mitchell-Lewis Motor Car Co.

In 1885 Mr. Wallis became secretary of the J. I. Case Plow Works, Racine, and president in 1892. He founded the Wallis Tractor Co. in 1912. The two businesses later were consolidated and about five years ago sold to the Massey-Harris Co., Ltd., Toronto, Ont. Mr. Wallis then retired to devote his time to breeding prize cattle on his estate near Racine. He was widely known for his philanthropies.

Fulton Co. Adding

MILWAUKEE, Feb. 16—The Fulton Co., manufacturer of automotive equipment specialties, is installing about $10,000 worth of new machinery to go into production on several new items, and within 30 days expects to add 50 men and operate on a full-time schedule with 100 men as the result of improved business.

Chrysler Betters Export Rank

DETROIT, Feb. 16—Chrysler Motors exports during 1930 amounted to 14.28 per cent of the total automotive export business, against 12.01 per cent in 1929, according to W. Ledyard Mitchell, chairman of the board, Chrysler Export Corp.

Steel Routine Demand Gains

Prices Generally Steady With Sporadic Shading

NEW YORK, Feb. 19—With seasonal gains in demand from automotive consumers well maintained, the steel market has not given up hope that before long there will be an increase in buying over that which is credited to the normal stepping up of inquiry from motor car manufacturers and parts makers during the second half of the year's first quarter. Prices, on the whole, rule steady although here and there soft spots are being uncovered where they are least expected.

While there is talk in some markets of an impending advance in the price of steel bars, some of the Middle West bar mills are reported to have shaded 1.75 cents, the heretofore general Chicago quotation. Revision of differentials in the wire market for the purpose of eliminating the untoward effect of low wire nail prices on quotations for other wire products has not affected base prices for bright hard and spring wire to manufacturing trade. Automotive demand for wire continues on the uptrend.

Good gains were made in February in orders booked by automotive alloy steel specialists. Furnishing of material by steel mills to automotive consumers in the form of blanks is a subject that is coming into the foreground of discussion. A few steel mills have installed press equipment for that purpose.

The principal argument advanced in favor of steel producers engaging in this secondary operation is the economy which results from the saving in freight on the scrap. The blanks cost less to ship from the steel mill, which can work up the scrap without having to pay return freight on it from the consumers' plants. The steel industry has always in the past taken an extremely conservative attitude on the subject of engaging in secondary operations. So far there are only a very few mills that have installed presses for blanking, and it remains to be seen whether the practice will grow or fall into disuse.

Pig Iron—Automotive foundries continue to take on iron at a satisfactory rate, although most of the business is still in small lots. The Michigan price for foundry and malleable continues at $17.50. The Valley market is quotable at $17 for foundry and $17.50 for malleable.

Aluminum—The market for virgin metal is unchanged. Secondary metal is stronger and fractionally higher, the 98 @ 99 per cent remelted being quoted at 17 @ 18 cents. The advance resulted from the paucity of the better grades of scrap.

Copper—Consuming demand is light, but the market opened the week firm on the 10 cents, delivered Connecticut, basis. The leading fabricating interest issued on Feb. 17 a new price list based on the 10 cent price for the unwrought metal.

Tin—The market has turned a shade firmer and slightly higher, the week's opening quotation for spot Straits tin being 25.80 cents.

Lead—Quiet and steady.

Zinc—Following extensive covering by consumers at 4 cents, East St. Louis, the market turned quiet but retained its firmness.

Canadian Financing Falls Off in December

New Car Paper Written on 1313 Units

OTTAWA, Feb. 16—Figures for automobile financing show a drop in December, as compared with November, 1930, and also indicate a falling off in comparison with financing in the month of December, 1929. The per cent of change is 6.8.

The total number of cars financed was 6754 in December, 6756 in November and 5700 in December, 1929, and the amount of financing was $2,945,589 in December, 1930, $3,028,253 in November, 1929, and $3,160,622 in December, 1929.

New cars financed were 1313 in December, 1930, 1584 in November and 1478 in December, 1929, while used cars financed were 5441 in December, 5172 in November and 4222 in December, 1929.

Values of new cars financed were $606,143. In December, $811,009 in November and $1,373,695 in December, 1929. Values in used cars financed totaled $2,339,446 in December, $2,217,244 in November and $1,786,927 in December, 1929.

Studebaker Dealers Meet

SOUTH BEND, Feb. 18—Two dealer meetings were held by Studebaker in the Southwest this week. On Feb. 9, nearly 200 dealers and distributors of the Kansas City branch gathered at a banquet in the Kansas City Athletic Club and heard addresses by Paul Hoffman, vice-president of Studebaker, and Paul Castner, sales manager of the S.P.A. Truck Corp. Knute Rockne, of Notre Dame, also spoke to the dealers. A similar meeting was held at Dallas on Feb. 10, where more than 100 heard the Studebaker representatives.

General Motors Sells 61,566 Units

NEW YORK, Feb. 16—General Motors dealers sold 61,566 cars to consumers in the United States during January, as compared with 74,167 in January of last year. Sales by General Motors Divisions to dealers for the month were 76,681, as compared with 94,458 cars in January of 1930. Total sales to dealers for the month, including Canadian sales and overseas shipments, were 89,349, as compared with 106,509 in January of 1930.

Walter K. Towers

DETROIT, Feb. 18—Walter K. Towers, 42 years, well known in advertising circles, died Tuesday after a long illness. From 1919 to 1921 he was sales promotion and export manager for Reo and from then until 1927 was advertising manager of Paige-Detroit Motor Car Co.

Poznan Fair Dates Set

DETROIT, Feb. 16—Jan Lech Byszewski, Polish consul here, advises that the Annual Internation Fair at Poznan, Poland, will be held this year during the week of April 26-May 3. Space for the exhibition of automobiles is available at a cost of zlotys 40 ($4.49) per sq. meter and a special section of the fair will be devoted to means of transportation. Information about the fair will be furnished by local Polish consulates in the United States.

Fairchild May Be Sold

NEW YORK, Feb. 16 — Fairchild Aviation Corp., subsidiary of the Aviation Corp. of Delaware, has called a special meeting of stockholders for March 4 to vote on the proposition of selling to the Aviation Corp., the Fairchild Airplane Mfg. Corp. and the Fairchild Engine Corp., together with the company's interests in the Faircam Realty Corp.

The Fairchild Corp. would retain the Fairchild Aerial Camera Corp., Fairchild Aerial Surveys, Inc., Kreider-Reisner Aircraft Co., Inc., Fairchild Aircraft, Ltd., and Aviation Corp. of Canada, Ltd.

There will also be a proposal for reduction of paid in capital to $5 a share for the 546,340 shares issued and the retirement of 5100 shares held in the treasury and 298,000 shares now held by the Aviation Corp., which will be acquired by Fairchild.

S.A.E. Plans Student Meeting

DETROIT, Feb. 16—The first of a series of meetings under the auspices of the Detroit section, S.A.E., for students in the technical schools in and about Detroit will be held in the General Motors research laboratory March 3.

Speakers on the program include William B. Stout and O. T. Kreusser. Mr. Stout will act as chairman of the meeting while Mr. Kreusser will speak on "Engineering Tests of the Automobile."

The Student Activities Committee of the Detroit section is headed by Alex. Taub of the Chevrolet Motor Car Co. The meeting is open to all members of the society.

Hall Lamp Reports Loss

DETROIT, Feb. 17—C. M. Hall Lamp Co. has reported net loss for year ended Dec. 31, 1930, of $43,741 after all charges, against net profit of $1,158,616, or $2.90 a share on 400,000 no par shares in 1929.

Briggs Recalls Workers

DETROIT, Feb. 18—Briggs Manufacturing Co. has recalled 500 former employees to work at its Highland Park plant which is devoted to production of Ford bodies.

January Employment Registers a Decrease

Automobile Plants Continue Lay-Offs

WASHINGTON, Feb. 17—Labor experience of automobile manufacturing plants in the United States during the calendar month of January, 1931, showed a general separation rate of 3.25 against an accession rate of 2.92. This compares with a separation rate for the month of 2.88 for all reporting establishments, which also had an accession rate of 2.97.

The January separation rate for the automobile manufacturing industry is divided as follows: Quit rate, 0.54; discharge rate, .18; and lay-off rate, 2.63.

On an equivalent annual basis, the January experience of the industry shows a general separation rate of 39.5 against an accession rate, which includes first employment and rehires, of 34.4.

M. & E. A. Foresees Successful Campaign

NEW YORK, Feb. 16—Dealer participation in the Motor and Equipment Association Care Will Save Your Car campaign for 1931 is regarded by the Sales Development Committee as indicative of a successful campaign for the year. An exceptionally large number of dealers who participated in 1930 are again signing up for the new year's campaign.

According to the committee, three state dealer associations have indorsed the campaign officially; namely: The Pennsylvania Automotive Association, the Michigan Automotive Trades Association, and the North Dakota Automotive Trades Association. A number of city dealer associations have also gone on record as favoring the movement.

Wico on Full Schedule

SPRINGFIELD, MASS., Feb. 16—Wico Electric Co. has resumed full-time operations and is producing more magnetos in pursuance of an increased volume of orders this month. A new magneto for multi-cylinder engines for use with tractors and stationary equipment promises to stimulate sales. This is now going into regular production. The annual report to stockholders shows $86,066 in net earnings after Federal and state taxes and all necessary reserves.

Hupp Reports Loss

DETROIT, Feb. 18—Hupp Motor Car Corp. reports for year ended Dec. 31 net loss of $922,765 after taxes, depreciation, etc., comparing with net profit of $3,468,936 or $2.35 a share on 1,475,373 shares $10 par stock during the past year.

Financial Notes

Briggs & Stratton Corp. reports net profit for the year 1930 of $882,352 after all charges. This is equivalent to $2.94 a share on common stock and compares with earnings of $1,499,018, or $4.99 a share, in 1929.

Stewart-Warner Corp., in a pamphlet report for 1930, shows net earnings of $1,262,278 after all regular charges and a write-down of $125,894 on its book values of investments in marketable securities. This is the same as shown in a preliminary report and is equivalent to 97 cents a share on common stock, and compares with earnings of $6,838,938, or $5.37 a share, in 1929.

Autocar Co. has declared regular quarterly dividend of $2.00 on preferred, payable March 15 to holders of record March 5.

E. I. du Pont de Nemours & Co. has declared regular quarterly dividend of $1.00 on common, payable March 14, to holders of record Feb. 26, and 1.50 on debentures payable April 25 to holders of record April 10.

Hutto Co. Released

DETROIT, Feb. 17—As a result of an agreement between the major creditors and the stockholders of Hutto Engineering Co. as to the future policies of the company in a special meeting held Feb. 13, the company was released from receivership.

Officers of the company now are: Marsden C. Hutto, chairman of the board; Henry P. Kirschner, president; Raymond A. Jacobs, vice-president; Roy H. Curtiss, secretary-treasurer. Joseph A. Carlin, who conducted the affairs of the company under the receivership, is being retained in the capacity of general manager.

The board of directors of the company includes Marsden C. Hutto, of Detroit; George R. Rayner, of Niagara Falls; Henry P. Kirschner, of Niagara Falls; Raymond A. Jacobs, of Detroit, and Richard A. Lansburgh, of Detroit.

Perfect Circle Sales Gain

CHICAGO, Feb. 16—Perfect Circle piston ring sales in January continued upward, according to Lothair Teetor, vice-president of the company.

In commenting on the January sales, Mr. Teetor stated, "Our business showed a decided increase during the month just finished. Total sales were 10 per cent greater than those in January, 1930, while replacement sales through automotive equipment jobbers marked up a gain of 52 per cent over the same month last year.

Transue Bookings Up

ALLIANCE, OHIO, Feb. 16—Transue and Williams Steel Forging Corp. operations have been increased as result of increased orders from automotive manufacturers, it has been announced. Volume of business in January was said to be twice as large as December and February bookings are likely to show a 50 per cent gain over January.

The company's earnings for 1930 as released this week show a net loss of $99,158 compared with net profit of $825,844 in 1929.

Stutz Shipments Increase

INDIANAPOLIS, Feb. 17—The Stutz Motor Car Co. reports that automobile shipments for January, 1931, were five times greater than shipments for the same period of 1930.

Chrysler Cuts Dividend

NEW YORK, Feb. 17—Chrysler Corp. reports net earnings for 1930 after all charges of $234,155. This compares with earnings for 1929 of $21,902,168. The balance sheet of the corporation shows current assets of $74,028,993. Current liabilities are $11,454,731, showing a ratio of assets to liabilities of 6.46.

The corporation directors' meeting today voted a dividend of 25 cents a share on common stock payable March 31 to stockholders of record March 2. This represents a decrease in dividends, those for the first three-quarters of the year being 75 cents a share.

Thermoid Reports Position

TRENTON, N. J., Feb. 16—The balance sheet of the Thermoid Co. and its wholly owned subsidiaries, exclusive of the Southern Asbestos Co., shows total current assets of $2,150,363, against current liabilities of $337,294, according to a condensed statement published today.

A separate balance sheet published for the Southern Asbestos Co. shows current assets of $446,897, against current liabilities of $81,485. A note to the balance sheet of the Southern Asbestos Co. states that although the company has purchase commitments for $204,000 for raw materials at prices in excess of market, these agreements have been modified, and the loss resulting will be nominal.

Chain Plant Shuts Down

YORK, PA., Feb. 16—A shutdown expected to last one to three weeks has been started by the tire chain department of the American Chain Co., Inc., plants in this city. Taking of inventory was the reason given by W. L. Brown, manager of the York plant. The Manley plant is operating on full time, as is the bumper plant, while the company's foundry is on part time. A few of the departments of the main plant have their employees on full time, but the majority are giving but part time employment.

Canadian Gilbert Plant Equipping

TORONTO, ONT., Feb. 16—The Gilbert & Barker Mfg. Co., Ltd., which came to Toronto last March, is installing new machinery which will enable them to produce on a large scale in 1931. They are a subsidiary of the Gilbert & Barker Co. of America, a wholly-owned subsidiary of Standard Oil of New Jersey.

Revenue Bureau Studies Depreciation Figures

Sets Probable Life of Automobiles at 4 Years

WASHINGTON, Feb. 18—Automobiles are assigned a probable useful life of four years and airplanes of five in "Depreciation Studies," a preliminary report of the Bureau of Internal Revenue, designed to be used as a basis for arriving at equitable depreciation figures for taxation purposes. In the booklet, which is published by the U. S. Treasury Department, taxpayers and employees of the Bureau are cautioned against arbitrary application of the figures given, which do not take into account variations in operation conditions, obsolescence practice, and accounting. The probable useful life and depreciation rate on other equipment of direct interest to the automotive industries have been assigned as follows:

Unit	Probable Useful Life	Depreciation Rate
Buses, motor		
Under $5,000	5	20
$5,000 to $7,500	6	16⅔
Over $7,500	7	14
Tractors	6	16⅔
Trucks		
Electric	10	10
Gasoline		
Under $1,000	3	33⅓
$1,500 to $2,500	4	25
Over $2,500	6	16⅔

Baldwin Reports Profit

DETROIT, Feb. 16—Baldwin Rubber Co., Pontiac, Mich., has reported for year ended Dec. 31, 1930, net profit of $150,855, after all charges and Federal taxes, equal to $3.03 a share on 49,655 shares of "A" stock outstanding and after allowance for "A" dividend of $1.50, equivalent to 75 cents per share on 100,690 shares of "B" stock outstanding. This compares with net profit of $152,216 in 1929, equal to $3.04 a share on "A" and 77 cents a share on "B" stock. Current assets on Dec. 31 totaled $301,014 against current liabilities of $57,216, a ratio of 5.26 to 1. Net working capital is $243,798.

Expect Record Aero Exhibit

DETROIT, Feb. 16—More new models of aircraft will be announced at the 1931 National Aircraft Show to be held in Detroit, April 11 to 19, than at any previous exhibition, according to the show committee. The show is jointly sponsored by the Aeronautical Chamber of Commerce of America, Inc., and the Aircraft Bureau of the Detroit Board of Commerce.

Canadian Buick Models to Continue Through '31

OSHAWA, ONT., Feb. 16—It has been decided by General Motors of Canada, Ltd., that there will not be the usual August announcement with regard to new models of the McLaughlin-Buick. The present line will be continued.

Stewart-Warner Reports Assets

Balance Sheet Shows No Income Change

CHICAGO, Feb. 16—Stewart-Warner Corporation's pamphlet report for the year ended Dec. 31, 1930, shows no change in net income from the preliminary figure of $1,262,278. The balance sheet as of Dec. 31, 1930, discloses current assets of $11,362,864, of which cash and liquid securities amounted to $3,837,194, against current liabilities of $1,120,800, compared with current assets of $14,891,606, of which cash and liquid securities were $2,610,367, against current liabilities of $2,030,661 on Dec. 31, 1929. Earned surplus of $14,022,823, as of Dec. 31 last, compared with $17,933,248 at the end of 1929.

In the Dec. 31 last surplus account, deduction of $1,623,230 was made for patents and licenses expenditures and development expenditures on new lines; deductions also were made of $492,221 for amortization of appreciation arising from appraisals of properties and of $464,161 for premium paid on fractional shares of stock dividends, making a total of $2,579,614 in these deductions.

Rubber Use Estimated

NEW YORK, Feb. 16—Crude rubber consumption for the month of January is estimated by the Rubber Manufacturers Association, Inc., at 27,557 long tons, an increase of 32.9 per cent over December consumption. Imports during the month were 37,098 long tons as compared with 34,895 long tons in December.

Total domestic stocks on hand and in transit as of Jan. 31 are estimated at 209,485 long tons, an increase of 3.6 per cent over December and 59 per cent over January, 1930.

Crude rubber afloat for the United States on Jan. 31 is estimated at 56,188 long tons as against 56,035 long tons on Dec. 31, and 61,863 on Jan. 31 a year ago.

Studebaker Sales Hold Up

SOUTH BEND, Feb. 18—Studebaker retail sales for January, 1931, in 45 cities show a substantial increase over sales for the corresponding period of 1930. For the country as a whole, January retail deliveries of Studebaker cars were 11 per cent below last year, according to the corporation.

Willys Signs 114 Dealers

TOLEDO, Feb. 16—One hundred and fourteen new dealers have signed Willys-Overland franchises since the introduction of the new Willys cars and trucks, according to George M. Graham, vice-president in charge of sales for the company. Thirty states are represented by these new dealers.

+ + CALENDAR + + OF COMING EVENTS

SHOWS

Quebec, Automobile .....Feb. 21-28
Memphis, Automobile .....Feb. 23-28
Des Moines, Automobile .....Feb. 23-28
Seattle, Wash., Automobile, Feb. 24-Mar. 1
Camden, N. J., Automobile, Feb. 25-March 2
Geneva, Automobile .....March 6-15
Los Angeles (Transportation).March 15-28
Altoona, Pa., Automobile.....April 15-27
International Garage Exposition, Berlin, Germany .....May 9-Aug. 9

CONVENTIONS

Road Show and School, Wichita, Feb. 24-27
American Chemical Society, Indianapolis, Ind. .....March 30-April 4
Aeronautical Chamber of Commerce, Detroit .....April 11-19
U. S. Chamber of Commerce, Atlantic City .....April 28-May 1
International Chamber of Commerce, Washington, D. C. .....May 4-9
National Foreign Trade Council, New York .....May 27-29
Fourth National Oil and Gas Power Meeting, A.S.M.E., Madison, Wis., June 15-18

SALONS

San Francisco, Calif., Palace Hotel, Feb. 21-28

Gets Manufacturing Rights

LA CROSSE, WIS., Feb. 16—Otto E. Muenster, inventor and patentee of the Dim-A-Glare Shield, has closed a contract with the Puffer-Hubbard Mfg. Co., Minneapolis, Minn., to manufacture the device on a royalty basis. The device fits into the ceiling of the car just to the left of the steering wheel, and has a ball and socket joint which makes it easy to swing the shield into any position in which it is fixed until moved. The shield has been in production in a limited way for more than a year.

De Vaux Begins March 1

OAKLAND, CALIF., Feb. 16—Norman De Vaux, president of the De Vaux-Hall Motors Corp., has announced here that the plants of the corporation in both Oakland and Grand Rapids will begin operations March 1. He expects an output at the start of 150 cars per day in each factory. The plants will employ about 1000 men.

FWD Production Gains

CLINTONVILLE, WIS., Feb. 16—The Four Wheel Drive Auto Co. reports a production increase in 1930 of 12 per cent over 1929, according to Walter A. Olen, president. He says 1930 was the biggest year in the company's history, covering 20 years. Ninety-five per cent of sales were made on a cash basis, and 61 per cent came from previous purchasers of FWD trucks.

December Tire Shipments Up

Those for 1930 Exceeded Output

NEW YORK, Feb. 16—Tire shipments during December increased over November by 18.6 per cent and were 3.8 per cent over December of 1930, according to statistics released by the Rubber Manufacturers Association, Inc.

Shipments for the month totaled 3,361,200 casings. Casings on hand as of Dec. 31 show a decline from November of 6.2 per cent, totaling 9,003,438.

Shipments during the year 1930 exceeded production by 5.3 per cent as compared with a reduction in inventory of 1 per cent in 1929.

Production for the month of December is placed at 2,814,086, an increase of 6 per cent over November.

Comparative figures for member companies, estimated at 80 per cent of the entire industry, follow:

Pneumatic Casings—All Types

		Inventory	Production	Shipments
Dec.	1930..	7,[illegible]50	2,251,269	2,688,960
Nov.	1930..	7,675,786	2,123,089	2,267,465
Dec.	1929..	9,470,388	2,445,817	2,589,515

Inner Tubes—All Types

Dec.	1930..	7,999,477	2,448,195	2,729,973
Nov.	1930..	8,250,432	2,143,609	2,230,654
Dec.	1929..	10,245,365	2,787,121	2,723,035

Balloon Casings

Dec.	1930..	5,941,061	1,812,825	2,221,887
Nov.	1930..	6,395,919	1,681,646	1,817,007
Dec.	1929..	7,160,127	1,783,784	1,920,396

Balloon Inner Tubes

Dec.	1930..	5,972,778	1,869,305	2,166,558
Nov.	1930..	6,280,151	1,540,066	1,716,564
Dec.	1929..	6,889,213	1,940,789	1,952,450

High Pressure Cord Casings

Dec.	1930..	2,026,699	578,890	563,415
Nov.	1930..	1,970,281	603,543	514,090
Dec.	1929..	3,339,451	844,904	768,331

High Pressure Inner Tubes

Dec.	1930..	2,026,699	578,890	563,415
Nov.	1930..	1,970,281	603,543	514,090
Dec.	1929..	3,339,451	844,904	768,331

Outboard Books Orders

MILWAUKEE, Feb. 16—Two orders aggregating $500,000 worth of business have just been placed with the Outboard Motors Corp., with main works and general offices in Milwaukee. The New York City distributor has ordered 4000 Evinrude engines for delivery between now and Oct. 1, this representing the largest individual contract ever received by Outboard. Reinhald Bros., distributors at Minneapolis, Minn., have ordered 1000 Evinrudes. The New York distributor has reported to the company that he took more orders with actual cash in hand at the National Motor Boat show this year than at any previous show since 1919.

Increases Capital Stock

CHICAGO, Feb. 16—The American Motor Investment Co. has increased its capital stock from $50,000 to $100,000.